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FILE 'USPAT' ENTERED AT 14:36:16 ON 16 SEP 92

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*****
*      WELCOME TO THE      *
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E2 1 6677596/AP
E3 1 --> 6677597/AP

E4	1	6677599/AP
E5	1	6677600/AP
E6	1	6677601/AP
E7	1	6677605/AP
E8	1	6677606/AP
E9	1	6677608/AP
E10	1	6677611/AP
E11	1	6677612/AP
E12	1	6677613/AP

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E3	1	--> 6870177/AP
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E9	1	6870184/AP
E10	1	6870185/AP
E11	1	6870186/AP
E12	1	6870187/AP

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		(06870177/AP)

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E1	1	7192471/AP
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E10	1	7192486/AP
E11	1	7192488/AP

E12 1 7192490/AP

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E1 1 7368828/AP
E2 1 7368830/AP
E3 0 --> 07368831/AP
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L2 1 S E3
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E 7368831/AP

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L3 2 L1 OR L2

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US PAT NO: 4,743,906 [IMAGE AVAILABLE] L3: 1 of 2

DATE ISSUED: May 10, 1988

TITLE: Time domain radio transmission system

INVENTOR: Larry W. Fullerton, Huntsville, AL

ASSIGNEE: Charles A. Phillips, Ardmore, TN, a part interest (part
interest)

APPL-NO: 06/870,177

DATE FILED: Jun. 3, 1986

REL-US-DATA: Continuation-in-part of Ser. No. 677,597, Dec. 3, 1984.

INT-CL: [4] G01S 13/04

US-CL-ISSUED: 342/27, 21; 375/1, 35
US-CL-CURRENT: 342/27, 21; 375/1, 35
SEARCH-FLD: 342/21, 22, 118, 120, 127, 132, 134, 145, 201, 27, 28; 375/1,
35

US PAT NO: 4,743,906 [IMAGE AVAILABLE] L3: 1 of 2
DATE ISSUED: May 10, 1988
TITLE: Time domain radio transmission system
REF-CITED:

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3,806,795	4/1974	Morey	324/337
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4,443,799	4/1984	Rubin	342/201
4,641,317	2/1987	Fullerton	375/1

US PAT NO: 4,743,906 [IMAGE AVAILABLE] L3: 1 of 2
DATE ISSUED: May 10, 1988
TITLE: Time domain radio transmission system

OTHER PUBLICATIONS

Skolnik, Intro. to Radar Systems; pp. 375-376; (McGraw-Hill, 1980).
Bennett et al., "Time-Domain Electromagnetics and Its Applications,"
Proceedings of the IEEE, vol. 66, No. 3, Mar. 1978.
Cook, J. C., "Monocycle Radar Pulses As Environmental Probes," Institute of
Science and Technology, The University of Michigan.

ART-UNIT: 222
PRIM-EXMR: Theodore M. Blum
ASST-EXMR: Bernarr E. Gregory
LEGAL-REP: C. A. Phillips

US PAT NO: 4,743,906 [IMAGE AVAILABLE] L3: 1 of 2
DATE ISSUED: May 10, 1988
TITLE: Time domain radio transmission system

ABSTRACT:

A communications system wherein there is employed a signal mixer in which a received signal is multiplied by a template signal, and then the output of the mixer is integrated. By this process, usable signals are obtained which would be otherwise obscured by noise.

19 Claims, 9 Drawing Figures

US PAT NO: 4,743,906 [IMAGE AVAILABLE] L3: 1 of 2

CLAIMS:

US PAT NO: 4,743,906 [IMAGE AVAILABLE] L3: 1 of 2

CLMS(1)

What is claimed is:

1. A time domain radar system comprising:
 - a transmitter comprising:
 - signal generating means for generating a series of trigger signals at spaced times,
 - a wideband transmitting antenna positioned for transmission into free space,
 - a source of D.C. power,
 - switching means responsive to said trigger signals and coupled to said source of D.C. potential and coupled to said transmitting antenna for abruptly switching between different states of a potential on said

US PAT NO: 4,743,906 [IMAGE AVAILABLE] L3: 1 of 2

CLMS(1)

- transmitting antenna, and transmitting a series of spaced, A.C., carrierless burst signals, each of which is generally monocyclic, into free space; and
 - a radio receiver comprising:
 - receiving means for receiving and providing an output responsive to wideband signals received from space between the times of transmission of said A.C. carrierless burst signals from said transmitting antenna,
 - detection signal generating means responsive to timing signals for locally generating time spaced local signals, each local signal including a single polarity up to the duration of one polarity of a said transmitted monocyclic burst signal as received,
 - timing means responsive to the times of transmissions of said series of said burst signals for generating, as a set, successive said timing

US PAT NO: 4,743,906 [IMAGE AVAILABLE] L3: 1 of 2

CLMS(1)

- signals and coupling them to said detection signal generating means, each said timing signal of a set occurring at a selected like time after the transmission of a said burst signal, wherein a said selected time is representative of the transit time from said transmitting antenna to a target at a selected distance and back to said receiving means,
 - output signal mixing and integration means responsive to a said output from

said receiving means and a said local burst signal for providing an output signal which is a function signal from mixing a said output of said receiving means and a local burst signal and integrating this function signal for the discrete period of said local signal, and integration means responsive to a successive set of output signals from said signal mixing and integration means responsive to a series of transmissions from said transmitting antenna, each of said last-named

US PAT NO: 4,743,906 [IMAGE AVAILABLE] L3: 1 of 2

CLMS(1)

output signals being for an identical time of transmitted burst signal travel, for providing an integrated signal, said integrated signal being indicative of the presence of signals having been reflected from a target at a selected distance.

CLMS(2)

2. A system as set forth in claim 1 wherein said timing means includes means for selectively delaying the production of timing signals of a discrete said set of successive said timing signals, whereby sensitivity of said radio receiver for different target ranges may be selected.

US PAT NO: 4,743,906 [IMAGE AVAILABLE] L3: 1 of 2

CLMS(3)

3. A system as set forth in claim 2 wherein said timing means is responsive to said signal generating means.

CLMS(4)

4. A system as set forth in claim 1 wherein said integration means includes means for sampling discrete output signals from said mixing and integration means and integrating the discrete samples.

CLMS(5)

5. A system as set forth in claim 4 wherein said integration means includes:

US PAT NO: 4,743,906 [IMAGE AVAILABLE] L3: 1 of 2

CLMS(5)

an analog-to-digital converter responsive to said output signals of said mixing and integration means for providing digital signal values of successive said output signals; and digital integration means for digitally integrating said digital signal values and providing said integrated signal.

CLMS(6)

6. A system as set forth in claim 1 wherein said signal generating means includes means for providing said trigger signals at varyingly spaced times.

CLMS(7)

US PAT NO: 4,743,906 [IMAGE AVAILABLE] L3: 1 of 2

CLMS(7)

7. A system as set forth in claim 1 wherein said switching means is positioned generally adjacent said transmitting antenna.

CLMS(8)

8. A system as set forth in claim 7 wherein said switching means includes an impedance coupled in circuit with said transmitting antenna and switching means.

CLMS(9)

9. A system as set forth in claim 8 wherein said impedance is electrical resistance.

US PAT NO: 4,743,906 [IMAGE AVAILABLE] L3: 1 of 2

CLMS(9)

CLMS(10)

10. A system as set forth in claim 9 wherein said transmitting antenna comprises two elements, and said switching means includes means in series with said electrical resistance and said two elements for discharging said elements.

CLMS(11)

11. A time domain radar system comprising:
a transmitter comprising:
control means for generating a first series of signals,

US PAT NO: 4,743,906 [IMAGE AVAILABLE] L3: 1 of 2

CLMS(11)

oscillator means for generating a second series of signals at a higher rate than said first series,

signal means responsive to said first and second series of signals for providing as an output a sequence of discrete signals of said second series of signals which are related to signals of said first series of signals, and said sequence of discrete signals provide trigger signals at spaced times,

a wideband transmitting antenna positioned for transmission into free space,

a source of D.C. power,

switching means responsive to said trigger signals and coupled to said source of D.C. potential and coupled to said transmitting antenna for abruptly switching between different states of a potential on said

US PAT NO: 4,743,906 [IMAGE AVAILABLE]

L3: 1 of 2

CLMS(11)

transmitting antenna, and transmitting a series of spaced, A.C., carrierless burst signals, each of which is generally monocyclic, into free space; and

a radio receiver comprising:

receiving means for receiving and providing an output responsive to signals received from space between the times of transmission of said A.C.

carrierless burst signals from said transmitting antenna,

detection signal generating means responsive to timing signals for locally generating time spaced local signals, each local signal including a single polarity up to the period of one polarity of a said transmitted monocyclic burst signal as received,

timing means responsive to said sequence of discrete signals from said signal means for generating as a set, successive said timing signals and

US PAT NO: 4,743,906 [IMAGE AVAILABLE]

L3: 1 of 2

CLMS(11)

coupling them to said detection signal generating means, each said timing signal of a set occurring at a selected like time after the transmission of a said burst signal, wherein a said selected time is representative of the transit time from said transmitting antenna to a target at a selected distance and back to said receiving means,

output signal mixing and integration means responsive to a said output from said receiving means and a said local burst signal for providing an output signal which is a function signal from mixing a said output and said receiving means and a local burst signal and integrating this function signal for the discrete period of said local signal, and

integration means responsive to a successive set of output signals from said signal mixing and integration means and the occurrence of a series of transmissions from said transmitting antenna, each of said last-named

US PAT NO: 4,743,906 [IMAGE AVAILABLE]

L3: 1 of 2

CLMS(11)

output signals being for an identical time of transmitted burst signal travel, for providing an integrated signal, said integrated signal being indicative of the presence or absence of signals having been reflected from a target at a selected distance.

CLMS(12)

12. A time domain radar system as set forth in claim 11 wherein said signal means comprises means for effecting as an output signal of said signals of said last-named means the next signal from said oscillator means following a said signal of said first series of signals from said control means.

US PAT NO: 4,743,906 [IMAGE AVAILABLE] L3: 1 of 2

CLMS(13)

13. A system as set forth in claim 12 wherein said timing means includes means for selectively delaying the production of timing signals of a discrete said set of successive said timing signals, whereby sensitivity of said radio receiver for different target ranges may be selected.

CLMS(14)

14. A system as set forth in claim 12 wherein said integration means includes means for sampling discrete output signals from said mixing and integration means and integrating the discrete samples.

US PAT NO: 4,743,906 [IMAGE AVAILABLE] L3: 1 of 2

CLMS(15)

15. A system as set forth in claim 14 wherein said integration means includes:
an analog-to-digital converter responsive to said output signals of said mixing and integration means for providing digital signal values of successive said output signals; and
digital integration means for digitally integrating said digital signal values and providing said integrated signal.

CLMS(16)

16. A system as set forth in claim 11 wherein said switching means is positioned generally adjacent said transmitting antenna.

US PAT NO: 4,743,906 [IMAGE AVAILABLE] L3: 1 of 2

CLMS(16)

CLMS(17)

17. A system as set forth in claim 16 wherein said switching means includes an impedance coupled in circuit with said transmitting antenna and switching means.

CLMS(18)

18. A system as set forth in claim 17 wherein said impedance is electrical resistance.

US PAT NO: 4,743,906 [IMAGE AVAILABLE] L3: 1 of 2

CLMS(19)

19. A system as set forth in claim 18 wherein said transmitting antenna comprises two elements, and said switching means includes means in series with said electrical resistance and said two elements for discharging power between said elements.

US PAT NO: 4,641,317 [IMAGE AVAILABLE] L3: 2 of 2
DATE ISSUED: Feb. 3, 1987
TITLE: Spread spectrum radio transmission system
INVENTOR: Larry W. Fullerton, Huntsville, AL

US PAT NO: 4,641,317 [IMAGE AVAILABLE] L3: 2 of 2
DATE ISSUED: Feb. 3, 1987
TITLE: Spread spectrum radio transmission system
ASSIGNEE: Charles A. Phillips, Ardmore, TN, a part interest (part interest)
APPL-NO: 06/677,597
DATE FILED: Dec. 3, 1984
INT-CL: [4] H04B 15/00; H04K 1/00; H04L 27/30
US-CL-ISSUED: 375/1, 23, 115
US-CL-CURRENT: 375/1, 23, 115
SEARCH-FLD: 375/1, 115, 2.1; 370/10, 107; 329/107; 332/9R; 307/265, 271; 455/26; 178/22.01
REF-CITED:
U.S. PATENT DOCUMENTS
3,806,795 4/1974 Morey 324/6

US PAT NO: 4,641,317 [IMAGE AVAILABLE] L3: 2 of 2
DATE ISSUED: Feb. 3, 1987
TITLE: Spread spectrum radio transmission system

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4,380,746	4/1983	Sun et al.	375/23

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Bennett et al., "Time-Domain Electromagnetics and its Applications,"
 Proceedings of the IEEE, vol. 66, No. 3, Mar. 1978.

Cook, J. C., "Monocycle Radar Pulses as Environmental Probes," Institute of
 Science and Technology, The University of Michigan.

ART-UNIT: 263

PRIM-EXMR: Robert L. Griffin

ASST-EXMR: Stephen Chin

US PAT NO: 4,641,317 [IMAGE AVAILABLE] L3: 2 of 2

DATE ISSUED: Feb. 3, 1987

TITLE: Spread spectrum radio transmission system

LEGAL-REP: C. A. Phillips

ABSTRACT:

A communications system wherein an intelligence signal modulates the spacing of relatively narrow pulses of a fixed rate pulse train, and these pulses key on a transmitter which employs a pair of series connected avalanche mode operated transistors. These are repetitively powered via a charged coaxial delay line, and the output, appearing across a resistive load, is fed directly, or through a shaping filter, to a discone transmitting antenna. At a receiving location, the received signal is amplified by a wide band amplifier and fed through a reverse contoured filter (of the transmitting filter, if one is employed). The signal is detected via synchronous detection

US PAT NO: 4,641,317 [IMAGE AVAILABLE] L3: 2 of 2

DATE ISSUED: Feb. 3, 1987

TITLE: Spread spectrum radio transmission system
 which locks onto the received pulse train, after which the modulation
 evidence by the pulse train is recovered by a low pass filter.

12 Claims, 4 Drawing Figures

US PAT NO: 4,641,317 [IMAGE AVAILABLE] L3: 2 of 2

CLAIMS:

CLMS(1)

What is claimed is:

US PAT NO: 4,641,317 [IMAGE AVAILABLE] L3: 2 of 2

CLMS(1)

1. A spread spectrum radio transmission system comprising:
 - a radio transmitter comprising:
 - pulse generating means for generating reoccurring pulses, said pulses appearing at a selected time spacing,
 - a source of intelligence signals, and
 - modulation means responsive to said pulses generating means and said source of intelligence signals for providing as an output a train of pulses wherein the leading edge of pulses is varied in time position as a function of intelligence signal;
 - avalanche semiconductor switching means, having a control signal input responsive to said output of said modulation means, a bias power input, and a switched power output, for switching power on and off to said switched power output;

US PAT NO: 4,641,317 [IMAGE AVAILABLE]

L3: 2 of 2

CLMS(1)

- a D.C. bias source coupled to said bias power input comprising a delay line having a delay of 1 picosecond to 50 nanoseconds and delay line charging means coupled to said delay line for charging said delay line between pulses of said train of pulses;
- transmitting antenna means comprising an aresonant antenna coupled to said switched power output and to space for transmitting a signal received from said switched power output; and
- a radio receiver comprising:
 - receiving antenna means comprising an aresonant antenna for receiving transmissions from said transmitting antenna means and for providing as an output electrical pulses responsive to the transmitted pulse signals,
 - amplification means responsive to the output of said receiving antenna means for amplifying received pulses,

US PAT NO: 4,641,317 [IMAGE AVAILABLE]

L3: 2 of 2

CLMS(1)

- synchronous detection means, including signal sensitive windowing means having a signal input responsive to the ouput of said amplification means, for responding to, and providing an output for, signals appearing within reoccurring windows of time generally coincident with the average time of occurrence of pulses received by said receiving means and including means for being insensitive to received signals appearing between the occurrence of said windows of time,
- signal conversion means for converting the output of said detection means into a replica of signals of said intelligence signals, and
- signal reproduction means responsive to the output of said signal conversion means for reproducing said intelligence signals.

US PAT NO: 4,641,317 [IMAGE AVAILABLE]

L3: 2 of 2

CLMS(2)

2. A system as set forth in claim 1 wherein said avalanche semiconductor switching means comprises at least one avalanche transistor connected in a common emitter configuration including said switched power output between the emitter and a common ground, a base as said control signal input, and having a collector as said bias power input.

CLMS(3)

3. A system as set forth in claim 1 wherein:
said delay line charging means comprises a D.C. power supply;
said bias power input and switched power output together comprises first and second terminals; and

US PAT NO: 4,641,317 [IMAGE AVAILABLE]

L3: 2 of 2

CLMS(3)

said charging means further comprises a resistor connected between said first terminal and said D.C. power supply of a value which, upon the onset of avalanche conditions of said avalanche semiconductor switching means, would drop the voltage across said avalanche semiconductor switching means to essentially zero.

CLMS(4)

4. A system as set forth in claim 3 wherein said aresonant antenna of said transmitting antenna means is coupled between said second terminal and said D.C. power supply.

US PAT NO: 4,641,317 [IMAGE AVAILABLE]

L3: 2 of 2

CLMS(5)

5. A system as set forth in claim 2 wherein said delay line comprises parallel connected 1 to 25 sections of coaxial cable of lengths of from 0.25" to 300", one end of the inner conductor of each said coaxial cable being connected to said collector, the outer conductor of the coaxial delay line being grounded, and the opposite end of the inner conductor being open.

CLMS(6)

6. A system as set forth in claim 3 wherein said avalanche semiconductor means comprises a transistor, in turn including an emitter coupled to said transmitting antenna means.

US PAT NO: 4,641,317 [IMAGE AVAILABLE]

L3: 2 of 2

CLMS(7)

7. A system as set forth in claim 6 wherein said switching means comprises at least two avalanche transistors with their collector-emitter circuits connected in series, a resistor, and power output being connected to the emitter of one of said transistors, and said D.C. bias source is connected between said resistor and a collector of another of said avalanche transistors.

CLMS(8)

8. A system as set forth in claim 1 wherein said synchronous detection means comprises an avalanche transistor having a signal input connected to the output of said amplification means and including adjustable gating means

US PAT NO: 4,641,317 [IMAGE AVAILABLE]

L3: 2 of 2

CLMS(8)

responsive to the occurrence of the leading edge of a signal output of said last-named avalanche transistor for disabling the input of said last named avalanche transistor for selected periods of time between said reoccurring windows of time.

CLMS(9)

9. A system as set forth in claim 1 wherein said synchronous detection means comprises:

a ring demodulator having a gating input, a signal input responsive to the output of said amplification means, and a signal output, said signal output comprising an output of said synchronous detection means;
voltage controlled oscillator means responsive to an average output of said

US PAT NO: 4,641,317 [IMAGE AVAILABLE]

L3: 2 of 2

CLMS(9)

output of said ring demodulation means for providing a pulse output at a frequency corresponding to an average rate of signal output of said ring demodulator means; and
gating means responsive to the output of said voltage controlled oscillator means for providing a gating input pulse to said ring demodulator means having a selected duration period defining a said reoccurring window of time.

CLMS(10)

10. A system as set forth in claim 9 wherein said gating means comprises:

a monostable multivibrator having an input coupled to said voltage controlled oscillator means and an output; and

US PAT NO: 4,641,317 [IMAGE AVAILABLE] L3: 2 of 2

CLMS(10)

a pulse transformer connected between the output of said monostable multivibrator and said gating input of said ring demodulator.

CLMS(11)

11. A system as set forth in claim 1 wherein said signal conversion means comprises an active type low pass filter.

CLMS(12)

12. A spread spectrum radio transmission system comprising:
a radio transmitter comprising:
pulse generating means for generating reoccurring pulses, said pulses

US PAT NO: 4,641,317 [IMAGE AVAILABLE] L3: 2 of 2

CLMS(12)

appearing at a selected time spacing,
a source of intelligence signals, and
modulation means responsive to said pulses generating means and said source of intelligence signals for providing as an output a train of pulses wherein the leading edge of pulses is varied in time position as a function of intelligence signal;
transmitting antenna means comprising an aresonant antenna having a switching power input and coupled to space for transmitting a signal;
switching means, having a control signal input responsive to said output of said modulation means, a bias power input, and a switched power output coupled to said switched power input of said antenna, for switching power on and off to said antenna;
a D.C. bias source coupled to said bias power input of said switching means;

US PAT NO: 4,641,317 [IMAGE AVAILABLE] L3: 2 of 2

CLMS(12)

and
a radio receiver comprising:
receiving antenna means comprising an aresonant antenna for receiving transmission from said transmitting antenna means and for providing as an output electrical pulses responsive to the transmitted pulse signals,
amplification means responsive to the output of said receiving antenna means for amplifying received pulses,
synchronous detection means, including signal sensitive windowing means

having a signal input responsive to the output of said amplification means, for responding to, and providing an output for, signals appearing within reoccurring windows of time generally coincident with the average time of occurrence of pulses received by said receiving means and including means for being insensitive to received signals appearing

US PAT NO: 4,641,317 [IMAGE AVAILABLE] L3: 2 of 2

CLMS(12)

between the occurrence of said windows of time,
signal conversion means for converting the output of said detection means into a replica of signals of said intelligence signals, and
signal reproduction means responsive to the output of said signal conversion means for reproducing said intelligence signals.

=> e fullerton, larry/in

E1	1	FULLERTON, JAMES T/IN
E2	1	FULLERTON, JESSE W/IN
E3	1	--> FULLERTON, LARRY/IN
E4	5	FULLERTON, LARRY W/IN
E5	1	FULLERTON, MARVIN R/IN
E6	1	FULLERTON, ROBERT A/IN
E7	3	FULLERTON, ROBERT L/IN
E8	1	FULLERTON, RONALD J/IN
E9	5	FULLERTON, W WARDLE/IN
E10	1	FULLERTON, WARDLE/IN
E11	1	FULLERTON, WILLIAM S/IN
E12	2	FULLERTON, WILLIAM W/IN

=> s e3-e4

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	5	"FULLERTON, LARRY W"/IN
L4	6	("FULLERTON, LARRY"/IN OR "FULLERTON, LARRY W"/IN)

=> s l4 not l3

L5 4 L4 NOT L3

=> d cit,ab 1-4

1. 5,020,374, Jun. 4, 1991, Velocity measurement system; Alan M. Petroff, et al., 73/861.25 [IMAGE AVAILABLE]

US PAT NO: 5,020,374 [IMAGE AVAILABLE] L5: 1 of 4

ABSTRACT:

A sonic-type fluid flow measuring system wherein reflections or echoes of an ultrasonic acoustic emitter are sensed and typically comprise a number of frequencies representative of a number of discrete velocities of flow in a volume of fluid. As a sample, they simply appear as a voltage plot as a function of time and wherein the time width of a given signal excursion relates to the frequency of a given signal. Thereafter, this time domain signal sample is converted to a frequency domain sample whereby the presence and magnitude of each frequency component, or velocity component, is isolated, this being typically done by what is known as a Fast Fourier

US PAT NO: 5,020,374 [IMAGE AVAILABLE] L5: 1 of 4

Transform. The highest frequency, velocity, signal from each of a rapid succession of samples is then obtained and stored in a memory. The highest and lowest of these are then discarded, and the remaining are averaged to obtain more likely representations of velocity. As the goal is to determine an average fluid velocity for a whole cross section of fluid flow, the measured peak velocity is a detected reference from which a lesser velocity, for example, 0.9, of it is chosen. To achieve a value for volume of flow, the average velocity is then multiplied by the cross-sectional area of the containment through which flow occurs.

2. 4,979,186, Dec. 18, 1990, Time domain radio transmission system; Larry W. Fullerton, 375/23, 37 [IMAGE AVAILABLE]

US PAT NO: 4,979,186 [IMAGE AVAILABLE] L5: 2 of 4

US PAT NO: 4,979,186 [IMAGE AVAILABLE] L5: 2 of 4

ABSTRACT:

A time domain communications system wherein time modulated, impulse derived signals are multiplied by a template signal, integrated, and then demodulated. By this process, usable signals are obtained which would be otherwise obscured by noise.

3. 4,813,057, Mar. 14, 1989, Time domain radio transmission system; Larry W. Fullerton, 375/37, 23, 96

US PAT NO: 4,813,057 L5: 3 of 4

ABSTRACT:

A time domain communications system wherein time modulated, impulse derived signals are multiplied by a template signal, integrated, and then

US PAT NO: 4,813,057 L5: 3 of 4
demodulated. By this process, usable signals are obtained which would be otherwise obscured by noise.

4. 4,596,023, Jun. 17, 1986, Balanced biphase transmitter using reduced amplitude of longer pulses; R. Byron Driver, et al., 375/55; 328/53; 332/104; 360/42; 375/17, 60

US PAT NO: 4,596,023

L5: 4 of 4

ABSTRACT:

The data communication system includes an encoder to receive nonreturn-to-zero data signals and convert them to biphase signals, a current mode transmitter for transmitting the biphase signals, and a communication link connected to the transmitter. The encoder senses transitions in the nonreturn-to-zero data signals and controls the amplitude of the biphase

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L5: 4 of 4

signals in response to the sensed transitions. These transitions are sensed by inverting and delaying the nonreturn-to-zero data signals and exclusively ORing these delayed and inverted signals with the nonreturn-to-zero data signals.

=> d fro,clm 2-3

US PAT NO: 4,979,186 [IMAGE AVAILABLE] L5: 2 of 4

DATE ISSUED: Dec. 18, 1990

TITLE: Time domain radio transmission system

INVENTOR: Larry W. Fullerton, Huntsville, AL

ASSIGNEE: Charles A. Phillips, Ardmore, TN, a part interest (part interest)

US PAT NO: 4,979,186 [IMAGE AVAILABLE] L5: 2 of 4

DATE ISSUED: Dec. 18, 1990

TITLE: Time domain radio transmission system

DISCL-DATE: Mar. 14, 2006

APPL-NO: 07/322,538

DATE FILED: Mar. 13, 1989

REL-US-DATA: Continuation-in-part of Ser. No. 10,440, Feb. 3, 1987, Pat. No. 4,813,057, which is a continuation-in-part of Ser. No. 677,597, Dec. 3, 1984, Pat. No. 4,641,317.

INT-CL: [5] H04B 15/00; H04K 1/00

US-CL-ISSUED: 375/23, 37

US-CL-CURRENT: 375/23, 37

SEARCH-FLD: 375/1, 23, 37, 96, 115; 370/10, 107; 329/313; 332/106; 307/265, 271; 380/35

US PAT NO: 4,979,186 [IMAGE AVAILABLE]

L5: 2 of 4

DATE ISSUED: Dec. 18, 1990
TITLE: Time domain radio transmission system
REF-CITED:

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3,806,795	4/1974	Morey	375/23
4,070,550	1/1978	Miller, Jr. et al.	375/23
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4,380,746	4/1983	Sun et al.	375/23
4,641,317	2/1987	Fullerton	375/23
4,813,057	3/1989	Fullerton	375/37

OTHER PUBLICATIONS

Bennett et al, "Time--Domain Electromagnetic and its Applications",

US PAT NO: 4,979,186 [IMAGE AVAILABLE] L5: 2 of 4
DATE ISSUED: Dec. 18, 1990
TITLE: Time domain radio transmission system
Proceedings of the IEEE, vol. 66, No. 3, Mar. 1978.
Cook, J. C., "Monocycle Radar Pulse as Environmental Probes", Institute and
Technology, The University of Michigan.
ART-UNIT: 263
PRIM-EXMR: Douglas W. Olms
ASST-EXMR: Stephen Chin
LEGAL-REP: Phillips & Beumer

ABSTRACT:

A time domain communications system wherein time modulated, impulse derived signals are multiplied by a template signal, integrated, and then demodulated. By this process, usable signals are obtained which would be

US PAT NO: 4,979,186 [IMAGE AVAILABLE] L5: 2 of 4
DATE ISSUED: Dec. 18, 1990
TITLE: Time domain radio transmission system
otherwise obscured by noise.
23 Claims, 9 Drawing Figures

US PAT NO: 4,979,186 [IMAGE AVAILABLE] L5: 2 of 4

CLAIMS:

CLMS(1)

I claim:

1. A time domain radio transmission system comprising:

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L5: 2 of 4

CLMS(1)

antenna means including at least one antenna for coupling signals between said antenna and its environment;
a radio transmitter comprising:
pulse generating means for generating reoccurring pulses units, wherein each pulse unit is comprised of at least one pulse signal,
a source of intelligence signals,
modulation means responsive to said pulse generating means and said source of intelligence signals for providing, as a modulated output, a train of signals wherein at least a discrete edge region of a last-named signal is varied in time position as a function of said intelligence signals,
a D.C. power source, and
power switching means coupled to said antenna and said power source having a control input responsive to a said modulated output for abruptly

US PAT NO: 4,979,186 [IMAGE AVAILABLE]

L5: 2 of 4

CLMS(1)

switching between the states of power applied to said antenna and not being applied to said antenna, whereby discrete switched pulses are transmitted as transmitted signals;
a radio receiver comprising:
receiving means coupled to said antenna means for receiving transmissions and for providing received signals,
signal generating means responsive to a control signal for generating, repetitively, template signals generally corresponding in time to an average time of occurrence of a signal portion of a said received signal from said transmitted signal, and
signal timing means responsive to said received signals and said template signals for generating said control signal; and
demodulation means comprising:

US PAT NO: 4,979,186 [IMAGE AVAILABLE]

L5: 2 of 4

CLMS(1)

multiplying means responsive to said template signals and said received signals for providing product signals,
signal means including integration means responsive to said product signals for providing an integral signal which is a function of the integral of said product signal, and
means responsive to said integral signal for reproducing said intelligence signals.

CLMS(2)

2. A system as set forth in claim 1 wherein said signal timing means includes signal controlled oscillating means responsive to received and Template signals for maintaining the time position of said template signals

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CLMS(2)
independent of modulation.

CLMS(3)

3. A system as set forth in claim 1 wherein:
said signal portion of a said received signal including a major lobe of one polarity;
said signal timing means includes first and second signal multipliers and means responsive to said received signals for applying as a first input to each of said first and second multipliers said received signals;
said signal generating means includes means for providing a first set of said template signals as a second input to said first multiplier and a second set of said template signals to said second multiplier, and wherein

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CLMS(3)
said second set of discrete signals are delayed for a period of substantially one-half the period of said major lobe of said received signals; and
said timing means includes combining means for combining of the outputs of said first and second multipliers for providing said control signals.

CLMS(4)

4. A system as set forth in claim 4 wherein said combining means is a differential amplifier.

CLMS(5)

US PAT NO: 4,979,186 [IMAGE AVAILABLE] L5: 2 of 4

CLMS(5)
5. A system as set forth in claim 1 wherein;
said demodulation means includes means responsive to the output of said integration means for providing timed output signals indicative of the time of occurrence of said received signal;
said signal generating means includes means for providing reference output signals which are a function of the average time of occurrence of said received signals;

said demodulation means includes pulse width generation means responsive to said timed output signals and said reference output signals for generating rectangular pulses which vary in width as a function of the variation in time of occurrence of said received signals; and
said demodulation means includes low pass filter means responsive to said rectangular pulses for providing a signal output which varies in amplitude

US PAT NO: 4,979,186 [IMAGE AVAILABLE] L5: 2 of 4

CLMS(5)

as a function of the width of said rectangular pulses.

CLMS(6)

6. A system as set forth in claim 1 wherein said power switching means is a light responsive switch, and said modulation means includes means for providing as said train of signals a train of pulses of light.

CLMS(7)

7. A system as set forth in claim 1 wherein said power switching means comprises at least one avalanche mode operated transistor including a collector electrode connected to said bias power input and capacitive means

US PAT NO: 4,979,186 [IMAGE AVAILABLE] L5: 2 of 4

CLMS(7)

connected between said collector and across the output of said transistor for storing bias power input pending receipt of a said modulated output.

CLMS(8)

8. A system as set forth in claim 1 wherein said power switching means includes at least one avalanche mode operated transistor having a collector connected to said bias power input and further including a shorted transmission line connected across said switched power output, said shorted transmission line being of an electrical length approximately equal to one-half of a selected pulse width.

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CLMS(9)

9. A system as set forth in claim 1 wherein said power switching means is immediate to and connected to said antenna.

CLMS(10)

10. A system as set forth in claim 9 wherein said switching means switches said antenna between a condition of power being applied to said antenna and not being applied to said antenna.

CLMS(11)

11. A time domain radio transmission system comprising:

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CLMS(11)

antenna means including at least one antenna for coupling signals between said antenna and a propagation medium;
a radio transmitter comprising:
a source of intelligence signals,
first signal generating means responsive to said source of intelligence signals for generating repetitive, time-spaced signals which vary from a constant pattern as a function of said intelligence signals and by a function of a selected pattern,
a power source, and
power switching means coupled to said antenna and said power source and responsive to said time-spaced signals for switching between states of power applied to said antenna and not being applied to said antenna at varying time-spaced intervals, whereby discrete switched voltage states

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CLMS(11)

are imposed on said antenna and transmitted as varying time separated bursts;
a radio receiver comprising:
receiving means coupled to said antenna means for receiving transmissions and for providing received signals,
second signal generating means responsive to control signals for generating, repetitively, template signals, and
signal timing means responsive to said received signals and said template signals for generating as said control signals, signals corresponding in time to the pattern of the output of said first signal generating means absent an applied intelligence signal; and
demodulation means comprising:
multiplying means responsive to said template signals and said received

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CLMS(11)

signals for providing product signals.
first signal means including integration means responsive to said product signals for providing integral signals which are a function of the

integral of said product signals, and
second signal means responsive to said integral signals for reproducing
said intelligence signals.

CLMS(12)

12. A system as set forth in claim 11 wherein said selected pattern is a
function of binary encoded signals.

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CLMS(13)

13. A system as set forth in claim 11 wherein said first signal generating
means includes means for generating a constant rate, variably
time-positioned, signals.

CLMS(14)

14. A system as set forth in claim 13 wherein said first signal generating
means comprises:
a fixed frequency oscillator for providing fixed frequency signals;
means for generating independent signals which are a function of said
selected pattern; and
signal combining means for combining said fixed frequency signals, said

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CLMS(14)

intelligence signals, and said independent signals for providing said
variably timed-spaced signals.

CLMS(15)

15. A system as set forth in claim 11 wherein said signal timing means
includes means for effecting a said control signal comprising means
responsive to received signals for averaging the effect of said intelligence
signals present and thereby eliminating the effective presence of said
intelligence signals in a said control signal.

CLMS(16)

US PAT NO: 4,979,186 [IMAGE AVAILABLE] L5: 2 of 4

CLMS(16)

16. A system as set forth in claim 1 further comprising a filter coupled to
said antenna.

CLMS(17)

17. A system as set forth in claim 16 wherein said filter effects time domain shaping of signals applied to said antenna.

CLMS(18)

18. A time domain system for receiving time domain signal transmissions transmitted by a transmitter comprising:
an antenna for coupling signals between said antenna and its environment;

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CLMS(18)

signal means for generating reoccurring signal units, wherein each signal unit is comprised of at least one pulse signal, a source of intelligence signals, modulation means responsive to said signal generating means and said source of intelligence signals for providing, as a modulated output, a train of signals wherein at least a discrete edge region of last-named signals are varied in time as a function of said intelligence signals, a D.C. power source, and power switching means coupled to said antenna and said power source having a control input responsive to a said modulated output for abruptly switching between the states of power applied to said antenna and not being applied to said antenna, whereby discrete switched effect signals are transmitted as transmitted signals;
said radio receiver comprising:
an antenna, and

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CLMS(18)

receiving means coupled to said antenna for receiving time domain transmissions and for providing received signals;
signal generating means responsive to control signals for generating, repetitively, template signals generally corresponding in time to an average time of occurrence of a signal portion of a said received signal from said transmitted signal;
demodulation means comprising:
multiplying means responsive to said template signals and said received signals for providing product signals,
signal means including integration means responsive to said product signals for providing an integral signal which is a function of the integral of said product signal, and
means responsive to said integral signal for reproducing said intelligence

US PAT NO: 4,979,186 [IMAGE AVAILABLE] L5: 2 of 4

CLMS(18)
signals.

CLMS(19)

19. A time domain radio receiver as set forth in claim 18 wherein said signal timing means includes signal controlled oscillating means for maintaining the time position of control signals independent of modulation.

CLMS(20)

20. A system as set forth in claim 18 wherein:
said signal portion of a said received signal including a major lobe of one polarity;

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CLMS(20)

said signal timing means includes first and second signal multipliers and means responsive to said received signals for applying as a first input to each of said first and second multipliers said received signals;
said signal generating means includes means for providing a first set of said template signals as a second input to said first multiplier and a second set of said template signals to said second multiplier, and wherein said second set of discrete signals are delayed for a period of substantially one-half the period of said major lobe of said received signals; and
said timing means includes combining means for combining of the outputs of said first and second multipliers for providing said control signals.

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CLMS(21)

21. A system as set forth in claim 20 wherein said combining means is a differential amplifier.

CLMS(22)

22. A system as set forth in claim 18 wherein:
said demodulation means includes means responsive to the output of said integration means for providing timed output signals indicative of the time of occurrence of said received signal;
said signal generating means includes means for providing reference output signals which are a function of the average time of occurrence of said received signals;

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CLMS(22)

said demodulation means includes pulse width generation means responsive to said timed output signals and said reference output signals for generating rectangular pulses which vary in width as a function of the variation in time of occurrence of said received signals; and
said demodulation means includes low pass filter means responsive to said rectangular pulses for providing a signal output which varies in amplitude as a function of the width of said rectangular pulses.

CLMS(23)

23. A time domain radio transmitter for transmitting signals to a radio receiver wherein the radio receiver comprises an antenna, receiving means coupled to said antenna means for receiving transmissions and for providing

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CLMS(23)

received signals, signal means responsive to a control signal for generating, repetitively, template signals generally corresponding in time to an average time of occurrence of a signal portion of a said received signal from a transmitted signal, signal timing means responsive to said received signals and said template signals for generating a said control signal, multiplying means responsive to said template signals and said received signals for providing product signals, signal means including integration means responsive to said product signals for providing an integral signal which is a function of the integral of said product signal, and means responsive to said integral signal for reproducing said intelligence signals, said transmitter comprising:
an antenna,
a source of intelligence signals,

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CLMS(23)

signal generating means responsive to said source of intelligence signals for generating repetitive, time-spaced signals which vary from a constant pattern as a function of said intelligence signals and by a function of a selected pattern,
a power source, and
power switching means coupled to said antenna and said power source and responsive to said time spaced signals for abruptly switching between states of power applied to said antenna and not being applied to said antenna at varying time-spaced intervals, whereby discrete switched voltage states are imposed on said antenna and transmitted as varying time separated signals.

US PAT NO: 4,813,057 L5: 3 of 4
DATE ISSUED: Mar. 14, 1989
TITLE: Time domain radio transmission system
INVENTOR: Larry W. Fullerton, Huntsville, AL
ASSIGNEE: Charles A. Phillips, Ardmore, TN, a part interest (part
interest)
APPL-NO: 07/010,440
DATE FILED: Feb. 3, 1987
REL-US-DATA: Continuation-in-part of Ser. No. 677,597, Dec. 3, 1984, Pat.
No. 4,641,317.
INT-CL: [4] H04B 15/00; H04K 1/00; H04L 27/30
US-CL-ISSUED: 375/37, 23, 96
US-CL-CURRENT: 375/37, 23, 96

US PAT NO: 4,813,057 L5: 3 of 4
DATE ISSUED: Mar. 14, 1989
TITLE: Time domain radio transmission system
SEARCH-FLD: 375/1, 115, 37, 23, 96; 370/10, 107; 329/107; 332/9R; 307/265,
271; 380/35
REF-CITED:
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4,070,550 1/1978 Miller, Jr. et al. 375/23
4,324,002 4/1982 Spilker, Jr. 375/23
4,380,746 4/1983 Sun et al. 375/23

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Proceedings of IEEE, vol. 66, No. 3, Mar. 1978.

US PAT NO: 4,813,057 L5: 3 of 4
DATE ISSUED: Mar. 14, 1989
TITLE: Time domain radio transmission system
Cook, J. C., "Monocycle Radar Pulse as Environmental Probes", Institute of
Science and Technology, The University of Michigan.
ART-UNIT: 263
PRIM-EXMR: Robert L. Griffin
ASST-EXMR: Stephen Chin
LEGAL-REP: C. A. Phillips

ABSTRACT:

A time domain communications system wherein time modulated, impulse derived signals are multiplied by a template signal, integrated, and then demodulated. By this process, usable signals are obtained which would be otherwise obscured by noise.

US PAT NO: 4,813,057 L5: 3 of 4
DATE ISSUED: Mar. 14, 1989
TITLE: Time domain radio transmission system
8 Claims, 10 Drawing Figures

US PAT NO: 4,813,057 L5: 3 of 4

CLAIMS:

CLMS(1)

What is claimed is:

1. A time domain radio transmission system comprising:
a radio transmitter comprising:

US PAT NO: 4,813,057 L5: 3 of 4

CLMS(1)

pulse generating means for generating reoccurring pulses units, wherein each pulse unit is comprised of at least one pulse signal,
a source of intelligence signals,
modulation means responsive to said pulse generating means and said source of intelligence signals for providing, as a modulated output, a train of signals wherein at least a discrete edge region of a last-named signal is varied in time position as a function of said intelligence signals,
transmitting antenna means comprising a wide band transmitting antenna, a D.C. power source, and
power switching means coupled to said wideband transmitting antenna and said power source having a control input responsive to a said modulated output for switching between the states of power applied to said wideband antenna and not being applied to said wideband antenna, whereby discrete

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CLMS(1)

switched pulses are transmitted as transmitted signals;
a radio receiver comprising:
receiving means comprising a wide band antenna for receiving transmissions from said transmitting antenna and for providing received signals,
signal generating means responsive to a control signal for generating, repetitively, template signals generally corresponding in time to an average time of occurrence of a said signal portion of a said received signal from a said transmitted signal, and
signal timing means responsive to said received signals and said template signals for generating said control signal; and

demodulation means comprising:

 multiplying means responsive to said template signals and said received signals for providing product signals,

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CLMS(1)

 signal means including integration means responsive to said product signals for providing an integral signal representative of the integral of said product signal, and
 means responsive to said integral signal for reproducing said intelligence signals.

CLMS(2)

2. A system as set forth in claim 1 wherein said power switching means includes at least one avalanche mode operated transistor having a collector connected to said bias power input and further including a shorted transmission line connected across said switched power output, said shorted transmission line being of an electrical length approximately equal to

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CLMS(2)

one-half of a selected pulse width.

CLMS(3)

3. A system as set forth in claim 1 wherein said signal generating means includes signal controlled oscillating means responsive to a said control signal for maintaining the time position of said template signals independent of modulation.

CLMS(4)

4. A system as set forth in claim 1 wherein:
said signal portion of a said received signal including a major lobe of one

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CLMS(4)

 polarity;
 said signal timing means includes first and second signal multipliers and means responsive to said received signals for applying as a first input to each of said first and second multipliers said received signals;
 said signal generating means includes means for providing a first set of said template signals as a second input to said first multiplier and a second set of said template signals to said second multiplier, and wherein

said second set of discrete signals are delayed for a period of substantially one-half the period of said major lobe of said received signals; and
said timing means includes combining means for combining of the outputs of said first and second multipliers for providing said control signals.

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L5: 3 of 4

CLMS(5)

5. A system as set forth in claim 4 wherein said combining means is a differential amplifier.

CLMS(6)

6. A system as set forth in claim 1 wherein;
said demodulation means includes means responsive to the output of said integration means for providing timed output signals indicative of the time of occurrence of said received signal;
said signal generating means includes means for providing reference output signals which are a function of the average time of occurrence of said received signals;

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L5: 3 of 4

CLMS(6)

said demodulation means includes pulse width generation means responsive to said timed output signals and said reference output signals for generating rectangular pulses which vary in width as a function of the variation in time of occurrence of said received signals; and
said demodulation means includes low pass filter means responsive to said rectangular pulses for providing a signal output which varies in amplitude as a function of the width of said rectangular pulses.

CLMS(7)

7. A system as set forth in claim 1 wherein said power switching means is a light responsive switch, and said modulation means includes means for providing as said train of signals a train of pulses of light.

US PAT NO: 4,813,057

L5: 3 of 4

CLMS(7)

CLMS(8)

8. A system as set forth in claim 1 wherein said power switching means comprises at least one avalanche mode operated transistor including a

collector electrode connected to said bias power input and capacitive means connected between said collector and across the output of said transistor for storing bias power input pending receipt of a said modulated output.

=> s (wideband or wide(w)band)/ti,ab

259 WIDEBAND/TI
467 WIDEBAND/AB
1650 WIDE/TI
14738 WIDE/AB
2950 BAND/TI
17420 BAND/AB
802 (WIDE(W)BAND)/TI,AB

L6 1346 (WIDEBAND OR WIDE(W)BAND)/TI,AB

=> s l6 and burst#

23691 BURST#
L7 83 L6 AND BURST#

=> s l7 and stepped

55570 STEPPED
L8 5 L7 AND STEPPED

=> d cit,ab 1-5

1. 4,870,370, Sep. 26, 1989, Method and apparatus for two stage automatic gain control; Dave Hedberg, et al., 330/133, 134; 379/347

US PAT NO: 4,870,370

L8: 1 of 5

ABSTRACT:

The present invention is a method and apparatus for implementing a two stage AGC circuit. In the preferred embodiment, the present invention is used as part of a receive channel in a modem. The first stage of the AGC is a "coarse" AGC and is used to track large signal transients of an input signal. The coarse AGC locks on to transient signals without excessive settling time. In operation, the coarse AGC acquires a new signal by using a nonlinear clipped feedback loop technique supported by a linearized feedback loop. The coarse AGC stage uses an error signal derived from the noncoherent power fluctuations of the incoming signal. The second stage of the AGC circuit is a "fine" AGC using a decision-directed coherent amplitude error signal and a quick linear feedback loop to correct for finer signal level fluctuations.

US PAT NO: 4,870,370

L8: 1 of 5

The fine AGC has a high pass characteristic which decouples its response from

that of the equalizer for stability reasons. The present invention avoids performance and response limitations of prior art AGC's in that the coarse stage is not required to have wide band response and associated noisy tracking response. Further, when the input signal is in quadrature amplitude modulation (QAM) the coarse stage tracks by using a nonlinear power detection algorithm which removes the effect of data power modulation. The fine AGC stage utilizes a decision-directed (coherent) error signal and a linear feedback loop with zero excess delay so that wideband response can be achieved without introducing amplitude modulation error in the signal path. As a result, the two stage scheme of the present invention can track rapid gain changes and restore correct data detection within a few baud, limiting error corruption to only one data block.

2. 4,812,920, Mar. 14, 1989, Wide band video signal recording apparatus; Yoshitake Nagashima, et al., 358/310, 330; 360/22, 23

US PAT NO: 4,812,920

L8: 2 of 5

ABSTRACT:

A wide band video signal recording apparatus is arranged to simultaneously record, on a recording medium, multi-channel video signals which are obtained by frequency modulating a luminance signal included in a wide band video signal; by frequency dividing the frequency modulated luminance signal at different phases thereof to obtain multi-channel luminance signals; and by multiplexing a carrier chrominance signal included in the video signal with the low band of at least one of the multi-channel luminance signals.

3. 4,763,103, Aug. 9, 1988, Process and method for wide band transmission, particularly for data transmission over an electricity distribution network; William Galula, et al., 340/310R, 310A; 375/1 [IMAGE AVAILABLE]

US PAT NO: 4,763,103 [IMAGE AVAILABLE]

L8: 3 of 5

ABSTRACT:

At transmission (10) each bit for transmission is coded as a function of its state by producing (12) a particular coding frequency combination, these being divided into two distinct bands spaced one from another and the coding combinations being chosen such that frequencies ranked in the same sequence place in these combinations do not occupy the same frequency band. A signal comprising the coding combination is injected to the network (N,P) and at reception (20), is applied to demodulators (22, 23), each assigned to one respective frequency band, to be correlated with locally generated signals (25, 26) which reproduce the coding combinations with a constant frequency shift, the bit state being determined (24) as a function of the correlation output.

4. 4,527,161, Jul. 2, 1985, 3D Imaging with stepped frequency waveforms and monopulse processing; Donald R. Wehner, 342/152, 179, 180, 196 [IMAGE AVAILABLE]

US PAT NO: 4,527,161 [IMAGE AVAILABLE] L8: 4 of 5

ABSTRACT:

A radar is disclosed that obtains three-dimensional radar images of targets for target identification at tactically useful ranges. Images are generated with the radar in a target angle and range tracking mode. The image is a plot, display or recording of position of target scatterers in range and two orthogonal cross-range dimensions. Range resolution is obtained by generating synthetic range profiles from the monopulse sum channel echo voltages which results from transmitting a stepped frequency waveform. Cross-range resolution is obtained by similarly processing differential cross-range error voltages of the echoes seen at the output of two orthogonal channels of a wideband monopulse receiver.

US PAT NO: 4,527,161 [IMAGE AVAILABLE] L8: 4 of 5

5. 4,450,444, May 22, 1984, Stepped frequency radar target imaging; Donald R. Wehner, et al., 342/25, 194, 196 [IMAGE AVAILABLE]

US PAT NO: 4,450,444 [IMAGE AVAILABLE] L8: 5 of 5

ABSTRACT:

An apparatus is disclosed by which radar targets can be imaged in two dimensions for identification at full radar range using relatively moderate speed data processing. Images of targets are found in range and cross-range dimensions from the time history of the targets' wideband spectral response obtained by a frequency stepping radar. A frequency synthesizer generates a series of N identical signal bursts, each burst comprising n pulses and each of said n pulses being a different frequency. The radar echos from this series of bursts is separated into n-phase and quadrature phase components.

US PAT NO: 4,450,444 [IMAGE AVAILABLE] L8: 5 of 5

These components are processed to calculate and store the relative amplitude of each echo signal and to determine the phase of each echo signal relative to the phase of the corresponding transmitted pulse. Further, the echo signals are inverse Fourier Transformed to generate an n.times.N Fourier Transform array representing a synthetic target range profile. The series of N range profile signatures is Fourier Transformed, range cell by range cell, to obtain the Doppler spectrum for each range cell. The resulting Doppler frequencies in each range cell are proportional to the target's angular rate of aspect change relative to the radar and the scatterer cross-range location in the range cell relative to an arbitrary aspect rotation act.

=> dis his

(FILE 'USPAT' ENTERED AT 14:36:16 ON 16 SEP 92)
 SET PAGELENGTH 18
 SET LINELENGTH 78
 E 6677597/AP
 L1 1 S E3
 E 6870177/AP
 L2 1 S E3
 E 7192475/AP
 E 7368831/AP
 L3 2 S L1 OR L2
 E FULLERTON, LARRY/IN
 L4 6 S E3-E4
 L5 4 S L4 NOT L3
 L6 1346 S (WIDEBAND OR WIDE(W)BAND)/TI,AB
 L7 83 S L6 AND BURST#
 L8 5 S L7 AND STEPPED

=> s burst#/ti,ab

318 BURST#/TI
 2430 BURST#/AB
 L9 2481 BURST#/TI,AB

=> s l9 and stepped

55570 STEPPED
 L10 116 L9 AND STEPPED

=> s l10 not l8

L11 115 L10 NOT L8

=> s l11 and (375*? or 370*?)/ccls

10725 375*?/CCLS
 (375*?/CCLS)
 11522 370*?/CCLS
 (370*?/CCLS)
 L12 21 L11 AND (375*? OR 370*?)/CCLS

=> d cit,ab 1-21

1. 4,955,038, Sep. 4, 1990, Low-power RF receiver; Robert D. Lee, et al.,
 375/35; 340/825.54; 342/21; 375/75; 455/343 [IMAGE AVAILABLE]

US PAT NO: 4,955,038 [IMAGE AVAILABLE]

L12: 1 of 21

ABSTRACT:

A RF receiver with extremely low standby power consumption. To minimize power consumption during standby, the analog input from the antenna circuit (including tank resonator) is connected directly to the inputs of a comparator.

Preferably two comparators are used, each connected to a separate antenna. Thus, a signal loss due to antenna nulls will be minimized.

US PAT NO: 4,955,038 [IMAGE AVAILABLE]

L12: 1 of 21

Preferably a following stage decodes a pulse-width-modulated (or burst-length-modulated) signal. If the length of pulses substantially exceeds the expected maximum, the following stage provides a control signal to reduce the gain of the input comparators.

2. 4,644,525, Feb. 17, 1987, Line transmission systems; Christopher W. H. Ellis, et al., 370/29, 24

US PAT NO: 4,644,525

L12: 2 of 21

ABSTRACT:

In a telephone system in which digitally coded speech or data is transmitted in burst mode between a subscriber's set and the local exchange the bursts may be of the same length in either direction or longer in one direction than the other in dependence upon the information to be

US PAT NO: 4,644,525

L12: 2 of 21

transmitted. Binary digit values making up the bursts are assembled for transmission in and held following reception of a shift register, and different output points along the register are selected in dependence upon the length of burst to be transmitted.

3. 4,599,732, Jul. 8, 1986, Technique for acquiring timing and frequency synchronization for modem utilizing known (non-data) symbols as part of their normal transmitted data format; Ronald S. LeFever, 375/13, 101, 112, 115

US PAT NO: 4,599,732

L12: 3 of 21

ABSTRACT:

A signal processing scheme through which the receiver may, at any time, synchronize or resynchronize itself to the transmitted data signals that are

US PAT NO: 4,599,732

L12: 3 of 21

received over a dynamic dispersive channel. At the transmitter, bursts or sequences of known symbols are interleaved with unknown data. At the receiver incoming frames of signals (containing interleaved bursts of known data and

unknown data) are processed in a manner similar to the processing of spread spectrum encoded data. A replica (or respective replicas) of the known signal burst(s) is (complex) correlated with the incoming signal to locate and lock onto a known (PN) reference symbol burst. Once a known symbol block has been located, a symbol rate clock (bit sync) is adjusted to track out any offset in the timing used for sampling the received data. This is followed by coarse and fine frequency offset adjustments to enable the local oscillator to lock onto the transmitted frequency.

4. 4,404,672, Sep. 13, 1983, Subscriber terminal for use in a time shared bidirectional digital communication network; Hiroshi Shimizu, 370/29, 110.1

US PAT NO: 4,404,672

L12: 4 of 21

ABSTRACT:

In a digital subscriber set (31) in which a line receiver (36) receives, when enabled, digital signal bursts from a master terminal (32) and in which a line driver (37) sends, when enabled, digital signal bursts to the master terminal in synchronism with the signal bursts received from the master terminal, a circuit (67, 69, 71, 72) temporarily disables and enables the line receiver and the line driver to send a call originating signal to the master terminal and then enables and disables the line receiver and the line driver continuously until synchronism is established by at least one digital signal burst which the master terminal supplies to the subscriber set in response to the call originating signal. The circuit recovers synchronism within the shortest possible time when synchronism is lost for any reason during communication.

5. 4,262,356, Apr. 14, 1981, Method and system for synchronizing a TDMA communication network comprising a satellite equipped with several directional beam antennas transmitting signals at various frequencies; Alex Lautier, et al., 370/104.1; 455/13.2 [IMAGE AVAILABLE]

US PAT NO: 4,262,356 [IMAGE AVAILABLE]

L12: 5 of 21

ABSTRACT:

A method and a system are disclosed for synchronizing within a recurrent time frame the starting points of the transmissions from the various stations in a TDMA network wherein N stations distributed among M separate zones covered by M different down-link frequencies exchange pulse bursts through a satellite, each pulse burst being comprised of a preamble, a unique word, the transmitting station's address, and traffic data. The satellite includes a global beam antenna which covers all of the M zones and is adapted to receive M different up-link frequencies, means for converting these M up-link frequencies to M corresponding down-link frequencies, and M directional beam

US PAT NO: 4,262,356 [IMAGE AVAILABLE]

L12: 5 of 21

antennas covering the M zones, each of said M antennas being adapted to transmit the down-link frequency associated with the particular zone it covers. The bursts transmitted by the various stations are assigned a predetermined position within the frame. Each station detects whether it has received a unique word followed by the address of a given station. Upon detecting such an address, the station activates timing means which define a time interval associated with the station whose address has been detected and, at the end of that time interval, starts transmitting M successive bursts respectively destined for the M zones during predetermined time intervals within the frame. These M bursts are transmitted at different up-link frequencies so that the burst intended for a given zone will be transmitted at the up-link frequency corresponding to the down-link frequency for that zone. In accordance with an embodiment of the invention, the timing means comprise M timers respectively defining N time intervals associated with the N stations. The start of a station's transmission is determined by

US PAT NO: 4,262,356 [IMAGE AVAILABLE] L12: 5 of 21
the timer which reaches its stopping point first.

6. 4,229,815, Oct. 21, 1980, Full duplex bit synchronous data rate buffer; Peter Cummiskey, 370/84; 341/61; 370/85.1, 91 [IMAGE AVAILABLE]

US PAT NO: 4,229,815 [IMAGE AVAILABLE] L12: 6 of 21

ABSTRACT:

The disclosed full duplex bit synchronous data rate buffer (15) adapts high speed burst data signals for transmission over low speed data facilities. The data rate buffer (15) includes a buffer control circuit (201-205, 105) for interactively controlling a first data buffer (101) for down-converting the high speed signals (107) to low speed signals (109) and a second data buffer (102) for up-converting low speed data signals (108) to high speed burst data signals (106). The data rate buffer (15) accepts random changes

US PAT NO: 4,229,815 [IMAGE AVAILABLE] L12: 6 of 21
in the length of each high speed burst data signal without a loss in bit synchronism and adjusts for changes in the number of burst data signals contained in each frame.

7. 4,184,116, Jan. 15, 1980, Communication system having analog-to-digital-to-analog conversion means; Ernest E. Olson, et al., 375/25, 45

US PAT NO: 4,184,116 L12: 7 of 21

ABSTRACT:

A communication system having a transmitter section and a receiver section. The transmitter converts an analog signal into a succession of binary coded words of equal length. The words are spaced apart by a fixed period of time.

The succession of binary coded words represents the amplitude of the analog

US PAT NO: 4,184,116

L12: 7 of 21

signal and is converted into a corresponding succession of bursts of energy, each burst of energy representing a bit of the binary coded word and having either a frequency at F_0 , representing a "0" in the binary coded word, or a frequency F_1 , representing a "1". The receiver section of the communication system receives the succession of bursts of energy and converts it into a succession of binary coded words representative of the originally transmitted words. A digital-to-analog converter provides a signal representative of the original analog signal from the succession of binary coded words.

8. 4,156,916, May 29, 1979, Pulse burst processing system and apparatus; Wolfgang J. Poppelbaum, 364/602; 307/261, 356; 328/28, 146, 186; 341/126, 130, 144, 157; 364/607; 375/118 [IMAGE AVAILABLE]

US PAT NO: 4,156,916 [IMAGE AVAILABLE]

L12: 8 of 21

ABSTRACT:

We describe a method and apparatus for handling information coded in the form of groups of pulses in sequential time slots forming blocks, each block having the same number of time slots. In this pulse transmission system an analog signal is converted to the above pulse code for transmission, and reconverted to analog form by an integration process. The process and apparatus are also adapted to arithmetic operations. An averaging device, employed in both transmission and arithmetic systems, includes a shift register provided with means for producing a current corresponding to the number of stages of the shift register in a given state.

9. 4,140,972, Feb. 20, 1979, System for synchronizing synthesizers of communication systems; James C. Administrator of the National Aeronautics and Space Administration with respect to an invention of Fletcher, et al., 455/68; 375/109, 113; 455/51.1, 265

US PAT NO: 4,140,972

L12: 9 of 21

ABSTRACT:

Frequency synthesizers at first and second stations that communicate with each other via a transmission link having a constant propagation delay time are started and synchronized by transmitting a tone from the first station to the second station via the link. The output frequencies of the two synthesizers correspond with each other and occur for the same length of time. At the second station, the tone is detected to cause the derivation of a tone burst having a predetermined frequency and duration. At the second station, a predetermined time interval after the derivation of the trailing edge of the tone burst, activation of the synthesizer at that station is initiated. The tone burst and frequencies derived from the synthesizer at

the second station are transmitted in sequence from the second station to the first station via the link. At the first station, the tone burst is

US PAT NO: 4,140,972

L12: 9 of 21

detected; detection of the trailing edge of the tone burst initiates operation of the synthesizer at the first station. The frequencies derived from the synthesizer at the second station are received at the first station and are combined with the frequencies derived from the synthesizer at the first station to derive a constant beat frequency as the two synthesizers are stepped.

10. 4,009,346, Feb. 22, 1977, Distributional activity compression; Brian E. Parker, et al., 370/80; 375/8; 455/12.1, 72 [IMAGE AVAILABLE]

US PAT NO: 4,009,346 [IMAGE AVAILABLE]

L12: 10 of 21

ABSTRACT:

Modular digital exchange terminals linked in a network by earth satellite provide coordinated multiplex switching and activity compression between line

US PAT NO: 4,009,346 [IMAGE AVAILABLE]

L12: 10 of 21

circuits and satellite time division channels. The line circuits carry digital data and digitalized voice telephone information into and out of the network. Nodal access modules (NAU's) interface to the satellite radio equipment. Branch exchange modules (NCU's) link line circuits switchably to a nodal access module through time division channels of subsidiary digital communication links. In transit up-link (to satellite time division channels) information is switched between lines and NCU buffer stores (virtual channels), selectively assigned by activity compression to time channels on associated digital links (each link accommodating only a fraction of the virtual traffic capacity of the associated stores), and transmitted to the NAU. In the NAU the activity compressed composite is time-concentrated with traffic of other digital links (in NAU buffer storage), and passed out on demand assigned satellite time division (traffic burst) channels. In downlink distribution to outlet line circuits the receiving NAU picks out from the interleaved network composite only the information channels destined

US PAT NO: 4,009,346 [IMAGE AVAILABLE]

L12: 10 of 21

for its outlet line circuits. These are stored, reordered in space/time associations with digital link time channels and activity compressed into associated digital link channels. The receiving NCU buffers and switches the information through associated internal (virtual) channels to respective outlet line circuits (destinations).

11. 4,009,345, Feb. 22, 1977, External management of satellite linked exchange network; Donald C. Flemming, et al., 370/93; 455/8

US PAT NO: 4,009,345

L12: 11 of 21

ABSTRACT:

Digital exchange terminals are linked by earth satellite and terrestrial point-to-point time division trunks in a privately coordinatable time division switching and communication network serving to connectively link

US PAT NO: 4,009,345

L12: 11 of 21

multiple ports attachable to separate voice telephone and data communication "subscriber" trunk lines. The terminals operate relative to the satellite in a time division multiple access (TDMA) system with a portion of the system capacity (traffic burst channels) variably allocated to the terminals by demand assignment. The demand assignment is autonomously controlled by the terminals through supervisory communications carried over dedicated satellite channels (Order Wires) also utilized for synchronization. Internally the terminals employ modular multiplex switching between ports and "virtual" channels (buffer stores) and voice activity compression (mapping of groups of up to n virtual channels into groups of up to m, m less than n, actual time division channels on the time division trunks). The activity compression serves to make the terrestrial and satellite channel resources of the system virtually available to more lines than can actually be served in one TDMA frame. External management (data processing) apparatus attached to a terminal line port supplies information stored by the terminals and used by the

US PAT NO: 4,009,345

L12: 11 of 21

terminals to restrict options in selecting connection path segments between respective ports and virtual channels. Thus, the network system may be adapted on various levels to balance its traffic loads (demand assignment "short term", network management/reconfiguration "longer term", and physical relocation of terminal modules/ports "longest term").

12. 3,838,221, Sep. 24, 1974, TDMA SATELLITE COMMUNICATIONS SYSTEM HAVING SPECIAL REFERENCE BURSTS; William G. Schmidt, et al., 370/104.1; 375/107; 455/13.2 [IMAGE AVAILABLE]

US PAT NO: 3,838,221 [IMAGE AVAILABLE]

L12: 12 of 21

ABSTRACT:

In a satellite transponder communications system operating in a time division multiple access mode, each earth station transmits data in a burst format.

US PAT NO: 3,838,221 [IMAGE AVAILABLE]

L12: 12 of 21

All bursts within a single transponder frame are synchronized to a special reference burst which contains no data communications. A single earth station sends out the reference burst as well as its normal burst, and in the case of multi transponders and multi transponder frames, the single reference station sends out all of the reference bursts for the various transponder frames. Data to be transmitted may be received in many different forms and included within the same burst because of the modular arrangement

of the earth stations. Individual terrestrial interface modules receive data in various forms, convert the data into bit form which is compatible with the TDMA system, store the converted bit stream and hold the compressed block of data until a multiplexer requests the block of data for inclusion into the earth station's transmitted burst. The arrangement of blocks of data within a burst and the timing and duration of a burst is controlled by digital words stored in a memory. Complete reordering of burst times and the arrangement of blocks of data within a burst is accomplished by changing

US PAT NO: 3,838,221 [IMAGE AVAILABLE] L12: 12 of 21
the words stored in the memory. A comparable system on the receive side of the earth station extracts blocks of data in selected bursts for conveyance to selected terrestrial interface modules.

13. 3,818,453, Jun. 18, 1974, TDMA SATELLITE COMMUNICATIONS SYSTEM; William G. Schmidt, et al., 370/104.1; 364/919, 919.2, 919.3, 929.2, 932.8, 939, 939.2, 939.7, 940, 942, 948.4, 948.5, 949.5, 950, 950.3, 951.1, 951.4, DIG.2; 375/109 [IMAGE AVAILABLE]

US PAT NO: 3,818,453 [IMAGE AVAILABLE] L12: 13 of 21

ABSTRACT:

In a satellite transponder communications system operating in a time division multiple access mode, each earth station transmits data in a burst format. All bursts within a single transponder frame are synchronized to a special

US PAT NO: 3,818,453 [IMAGE AVAILABLE] L12: 13 of 21
reference burst which contains no data communications. A single earth station sends out the reference burst as well as its normal burst, and in the case of multi-transponders and multi-transponder frames, the single reference station sends out all of the reference bursts for the various transponder frames. Data to be transmitted may be received in many different forms and included within the same burst because of the modular arrangement of the earth stations. Individual terrestrial interface modules receive data in various forms, convert the data into bit form which is compatible with the TDMA system, store the converted bit stream and hold the block of data until a multiplexer requests the block of data for inclusion into the earth station's transmitted burst. The arrangement of blocks of data within a burst and the timing and duration of a burst is controlled by digital words stored in a memory. Complete reordering of burst times and the arrangement of blocks of data within a burst is accomplished by changing the words stored in the memory. A comparable system on the receive side of

US PAT NO: 3,818,453 [IMAGE AVAILABLE] L12: 13 of 21
the earth station extracts blocks of data in selected bursts for conveyance to selected terrestrial interface modules.

14. 3,812,430, May 21, 1974, TDMA SATELLITE COMMUNICATIONS SYSTEM WITH

IMPROVED ACQUISITION; William G. Schmidt, et al., 375/107; 370/95.3, 104.1; 375/109

US PAT NO: 3,812,430

L12: 14 of 21

ABSTRACT:

In a satellite transponder communications system operating in a time division multiple access mode, each earth station transmits data in a burst format. All bursts within a single transponder frame are synchronized to a special reference burst which contains no data communications. A single earth station sends out the reference burst as well as its normal burst, and in

US PAT NO: 3,812,430

L12: 14 of 21

the case of multi transponders and multi transponder frames, the single reference station sends out all of the reference bursts for the various transponder frames. Data to be transmitted may be received in many different forms and included within the same burst because of the modular arrangement of the earth stations. Individual terrestrial interface modules receive data in various forms, convert the data into bit form which is compatible with the TDMA system, store the converted bit stream and hold the block of data until a multiplexer requests the block of data for inclusion into the earth station's transmitted burst. The arrangement of blocks of data within a burst and the timing and duration of a burst is controlled by digital words stored in a memory. Complete reordering of burst times and the arrangement of blocks of data within a burst is accomplished by changing the words stored in the memory. A comparable system on the receive side of the earth station extracts blocks of data in selected bursts for conveyance to selected terrestrial interface modules.

US PAT NO: 3,812,430

L12: 14 of 21

Acquisition of the correct burst position is accomplished by sending out a low power signal and, adjusting its phase until it coincides with the proper received burst position. The low power signal is simply a square wave signal which is in phase with the start signal from the burst synchronizer.

15. 3,806,879, Apr. 23, 1974, TDMA SATELLITE COMMUNICATION SYSTEM WITH MULTI-PCM FRAMES PER TDMA FRAME; William G. Schmidt, et al., 370/104.1; 364/DIG.2; 370/68, 109 [IMAGE AVAILABLE]

US PAT NO: 3,806,879 [IMAGE AVAILABLE]

L12: 15 of 21

ABSTRACT:

In a satellite transponder communications system operating in a time division multiple access mode, each earth station transmits data in a burst format. All bursts within a single transponder frame are synchronized to a special

US PAT NO: 3,806,879 [IMAGE AVAILABLE]

L12: 15 of 21

reference burst which contains no data communications. A single earth

station sends out the reference burst as well as its normal burst, and in the case of multi transponders and multi transponder frames, the single reference station sends out all of the reference bursts for the various transponder frames. Data to be transmitted may be received in many different forms and included within the same burst because of the modular arrangement of the earth stations. Individual terrestrial interface modules receive data in various forms, convert the data into bit form which is compatible with the TDMA system, store the converted bit stream and hold the compressed block of data until a multiplexer requests the block of data for inclusion into the earth station's transmitted burst. The arrangement of blocks of data within a burst and the timing and duration of a burst is controlled by digital words stored in a memory. Complete reordering of burst times and the arrangement of blocks of data within a burst is accomplished by changing the word stored in the memory. A comparable system on the receive side of the

US PAT NO: 3,806,879 [IMAGE AVAILABLE] L12: 15 of 21
earth station extracts blocks of data in selected bursts for conveyance to selected terrestrial interface modules. A terrestrial interface module is provided for receiving multiple voice channels and converting same into PCM data frames. The TDMA frame time is greater than a PCM data frame and thus multiple frames of PCM data are transmitted in a single burst, once per TDMA frame. The terrestrial interface module rearranges the digital voice channels so that consecutive digitized samples from the same voice channel are ultimately transmitted in a contiguous format.

16. 3,787,634, Jan. 22, 1974, SYSTEM FOR CONTROLLING THE TRANSMIT TIME OF STATIONS WHICH ARE IN COMMUNICATION WITH ONE ANOTHER VIA A SATELLITE;
Heinz
Haberle, et al., 370/104.1; 375/107

US PAT NO: 3,787,634 L12: 16 of 21

US PAT NO: 3,787,634 L12: 16 of 21

ABSTRACT:

This relates to timing control of message bursts in a TDMA communication satellite system. Each ground station stores information as to both its time slot of transmission and duration of transmission as determined by a master station. The timing control is derived by comparing the received timing information with the stored timing information. When a difference is detected, the transmit timing is altered as required to carry on communication and maintain complete frame fill even when certain stations of the system are not involved in communication.

17. 3,778,715, Dec. 11, 1973, TDMA SATELLITE COMMUNICATIONS SYSTEM WITH RAPID AUTOMATIC RE-ENTRY FOLLOWING BRIEF OUTAGES OF EARTH STATION EQUIPMENT;
William G. Schmidt, et al., 370/95.3, 104.1; 455/8, 13.2 [IMAGE

AVAILABLE]

US PAT NO: 3,778,715 [IMAGE AVAILABLE]

L12: 17 of 21

ABSTRACT:

In a satellite transponder communications system operating in a time division multiple access mode, each earth station transmits data in a burst format. All bursts within a single transponder frame are synchronized to a special burst which contains no data communications. A single earth station sends out the reference burst as well as its normal burst and in the case of multi transponders and multi transponder frames, the single reference station sends out all of the reference bursts for the various transponder frames. Data to be transmitted may be received in many different forms and included within the same burst because of the modular arrangement of the earth stations. Individual terrestrial interface modules receive data in various forms, convert the data into bit form which is compatible with the TDMA system, store the converted bit stream and hold the block of data until a multiplexer requests the block of data for inclusion into the earth station's

US PAT NO: 3,778,715 [IMAGE AVAILABLE]

L12: 17 of 21

transmitted burst. The arrangement of blocks of data within a burst and the timing and duration of a burst is controlled by digital words stored in a memory. Complete reordering of burst times and the arrangement of blocks of data within a burst is accomplished by changing the words stored in the memory. A comparable system on the receive side of the earth station extracts blocks of data in selected bursts for conveyance to selected terrestrial interface modules. Loss of synchronization at an earth station due to short time transmission interruptions is compensated for by predicting the correct burst transmission time following the end of said interruption.

18. 3,772,475, Nov. 13, 1973, SATELLITE COMMUNICATIONS SYSTEM WITH SUPER FRAME FORMAT AND FRAME SEGMENTED SIGNALLING; Albert Loffreda, 370/104.1, 105, 110.1; 375/107; 455/13.2 [IMAGE AVAILABLE]

US PAT NO: 3,772,475 [IMAGE AVAILABLE]

L12: 18 of 21

ABSTRACT:

In a TDMA (time division multiple access) satellite communications system, the individual frames, comprising bursts from all participating Earth stations, are grouped in a super frame which comprises a fixed plurality of individual frames. The beginning of each super frame is identified by including super frame marker codes within the station bursts during the first frame of the super frame. The super frame marker for each station is time synchronized with the super frame marker of a reference station. Destination signalling is time divided throughout the super frame in accordance with a pre-assignment, thereby eliminating the requirement for accompanying signalling bits with a destination address code.

19. 3,730,998, May 1, 1973, TDMA SATELLITE COMMUNICATIONS SYSTEM WITH AN APERTURE WINDOW FOR ACQUISITION; William G. Schmidt, et al., 370/104.1; 375/107

US PAT NO: 3,730,998

L12: 19 of 21

ABSTRACT:

In a satellite transponder communication system operating in a time division multiple access mode, each earth station transmits data in a burst format. All bursts within a single transponder frame are synchronized to a special reference burst which contains no data communications. A single earth station sends out the reference burst as well as its normal burst, and in the case of multi transponders and multi transponder frames, the single reference station sends out all of the reference bursts for the various transponder frames. Data to be transmitted may be received in many different forms and included within the same burst because of the modular arrangement of the earth stations. Individual terrestrial interface modules receive data in various forms, convert the data into bit form which is compatible with the TDMA system, store the converted bit stream and hold the block of data until

US PAT NO: 3,730,998

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a multiplexer requests the block of data for inclusion into the earths station's transmitted burst. The arrangement of blocks of data within a burst and the timing and duration of a burst is controlled by digital words stored in a memory. Complete reordering of burst times and the arrangement of blocks of data within a burst is accomplished by changing the words stored in the memory. A system on the receive side of the earth station extracts blocks of data in selected bursts for conveyance to selected terrestrial interface modules. Acquisition of the proper burst time within each frame is accomplished by sending out a low power signal and monitoring its phase relative to the received frame reference. Apertures are provided to insure that no two earth stations are simultaneously in the acquisition mode.

20. 3,593,138, Jul. 13, 1971, SATELLITE INTERLACE SYNCHRONIZATION SYSTEM; James G. Dunn, et al., 375/3; 342/88; 375/58, 116; 455/11.1 [IMAGE AVAILABLE]

US PAT NO: 3,593,138 [IMAGE AVAILABLE]

L12: 20 of 21

ABSTRACT:

A master station and a plurality of slave stations include synchronization equipment to enable each of the stations to have access to a common repeater in a different time slot of a time division multiplex format at the repeater, there being motion between the stations and the repeater. The master station propagates a sync burst through the repeater. Each of the stations receives this sync burst from the repeater and adjusts the frequency of the timing signals therein to compensate for the doppler shift experienced in the

propagation path from each of the stations to the repeater so that the desired frequency of the timing signals is present in the repeater. Each of the slave stations also propagates different low power level, psuedo noise code ranging signal through the repeater back to itself which is used to adjust the phase of the timing signals digitally and in an analog manner by

US PAT NO: 3,593,138 [IMAGE AVAILABLE] L12: 20 of 21
means of a motor-driven phase shifter to account for the changing range between the repeater and each of the slave stations so that a data burst of each of the slave stations appears in the proper time slot of the time division multiplex format at the repeater.

21. 3,573,626, Apr. 6, 1971, AUTOMATIC RADIO FREQUENCY PULSE MEASUREMENT SYSTEM; Robert J. Ertman, 375/10

US PAT NO: 3,573,626 L12: 21 of 21

ABSTRACT:

The microwave pulse signal measurement system described herein automatically derives the Fourier power spectrum of a microwave pulse train from a unit under test and simultaneously measures the frequency at which the microwave pulses have their maximum power. The input microwave pulses are mixed with

US PAT NO: 3,573,626 L12: 21 of 21
local signals generated in a microwave synthesizer which is controlled by a programmer to change the frequencies of the local signals in discrete steps. The intermediate frequency burst obtained from the mixer upon occurrence of each microwave pulse is sampled and translated into digital information. A Fourier transform computer obtains from this digital information, output information as to the power density of different frequency components across the spectrum of the microwave pulse. This digital information can be displayed on an oscilloscope or a plotter to provide a visual presentation of the power spectrum of the microwave pulse. The computer outputs are also translated into digital outputs corresponding to the Fourier component having maximum power. These digital outputs may be subtracted from digital outputs obtained from the synthesizer which represent the frequency of the local signals to produce a number directly indicating the frequency at which the microwave pulse has its maximum power.

=> file jpoabs

FILE 'JPOABS' ENTERED AT 14:54:10 ON 16 SEP 92

* J A P A N E S E P A T E N T A B S T R A C T S *

*

*

* CURRENTLY, DATA IS LOADED THROUGH THE ABSTRACT PUBLICATION *

* DATE OF AUGUST 30, 1991.

*

* THE LATEST GROUPS RECEIVED ARE: C0862 E1105, M1150 & P1245. *

=> s burst#

L13 4116 BURST#

=> s l13 and stepped

8578 STEPPED
L14 0 L13 AND STEPPED

=> dis his

(FILE 'USPAT' ENTERED AT 14:36:16 ON 16 SEP 92)
SET PAGELENGTH 18
SET LINELENGTH 78
E 6677597/AP
L1 1 S E3
E 6870177/AP
L2 1 S E3
E 7192475/AP
E 7368831/AP
L3 2 S L1 OR L2
E FULLERTON, LARRY/IN
L4 6 S E3-E4
L5 4 S L4 NOT L3
L6 1346 S (WIDEBAND OR WIDE(W)BAND)/TI,AB
L7 83 S L6 AND BURST#
L8 5 S L7 AND STEPPED
L9 2481 S BURST#/TI,AB
L10 116 S L9 AND STEPPED
L11 115 S L10 NOT L8
L12 21 S L11 AND (375*? OR 370*?)/CCLS

FILE 'JPOABS' ENTERED AT 14:54:10 ON 16 SEP 92
L13 4116 S BURST#
L14 0 S L13 AND STEPPED

=> s l13 and (wideband or wide(w)band)

40 WIDEBAND
30365 WIDE
37964 BAND
2044 WIDE(W)BAND
L15 19 L13 AND (WIDEBAND OR WIDE(W)BAND)

=> d cit,ab 1-19

1. 03-148986, Jun. 25, 1991, CHROMINANCE SIGNAL PROCESSING CIRCUIT;
SHIGENORI SHIBUE, et al., H04N 9*64

03-148986

L15: 1 of 19

ABSTRACT:

PURPOSE:To execute hue correction stably and extending over a wide band

03-148986

L15: 1 of 19

by demodulating a carrier chrominance signal whose phase variation component of low frequency is reduced by a closed loop phase correction system by a signal obtained by modulating the phase of a reference signal at high speed by a residual phase error component.

CONSTITUTION:In a phase correction circuit 100, a closed loop is set up so that the phase of a color burst signal and the phase of the output signal of a reference signal generation circuit 6 synchronize always with each other. The comparatively low frequency component of the phase variation of the input signal of a terminal 30 is corrected by this closed loop. Next, the output signal of the phase correction circuit 100 is supplied to a chrominance signal demodulator DEM 38, and is demodulated by making the output signal of a phase modulator 37 a carrier, and color difference signals R-Y, B-Y are obtained. Further, actual variation is suppressed by the phase

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L15: 1 of 19

correction circuit 100 so as to be about ± 10 degrees. Accordingly, the dynamic range of the phase modulator 37 need not be made wide, and every stable operation is possible.

2. 02-246946, Oct. 2, 1990, PULSE SYSTEM ULTRASONIC NON-LINEAR PARAMETER CT;
YOSHIKATSU NAKAGAWA, A61B 8*00; G01N 29*06

02-246946

L15: 2 of 19

ABSTRACT:

PURPOSE:To reduce the influence of the refraction of an ultrasonic wave to cause the degradation of picture quality of a recomposed tomogram by using a

02-246946

L15: 2 of 19

array shaped hydrophone with a wide opening as a wave receiver.

CONSTITUTION: A wave transmitter 1 and a wave receiver 3 are simultaneously scanned linearly in an arrow D.sub.1 or D.sub.2 direction. The wave receiver 3 is the wave receiver with the wide opening where the hydrophone used in a wide band from the frequency of one part wave over the frequency of the second higher harmonic is made into elements and arranged in an array shape, and it is installed so that the center of the wave receiving surface can be made into the sound axis B of a wave transmitting beam. The wave transmitter 1 and wave receiver 3 are simultaneously scanned in the same direction, and projection data are measured. In such a manner, respective amplitudes of a primary wave and a secondary wave and the propagation time of the primary wave are measured from the circumferential 180.degree. direction of a subject 2, and they are made into the projection data at the time of recomposing

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respective tomograms. Even when a burst wave transmitting beam changes the propagation direction by the refractive index distribution of the object 2, since the wave receiver 3 with the wide opening is used, a transmitted wave cannot be failed to be received.

3. 02-194795, Aug. 1, 1990, MAGNETIC RECORDING/REPRODUCING DEVICE; HIKARI MASUI, H04N 9*83

02-194795

L15: 3 of 19

ABSTRACT:

PURPOSE: To make a chrominance signal band into a wide band, and to

02-194795

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improve the quality of a picture by multiplexing the high band component of a chrominance signal to a luminance signal, and angle-modulation-recording it.

CONSTITUTION: The chrominance signal inputted from an input terminal 2 is separated into a high band signal and a low band signal by a filter 27, and a burst signal is added to both the high band signal and the low band signal, and the high band component of the chrominance signal separated by the filter 27 is synthesized with the luminance signal, and is angle-modulation-recorded on a magnetic tape 13. On the other hand, the low band component of the chrominance signal is frequency-multiplex-recorded on the low band side of an angle-modulated luminance signal. Thus, the bandwidth of the chrominance signal can be expanded, and the picture quality can be improved.

4. 02-142550, May 31, 1990, ULTRASONIC ECHO DOPPLER DEVICE; YASUTO TAKEUCHI,
A61B 8*14; A61B 8*06

02-142550

L15: 4 of 19

ABSTRACT:

PURPOSE:To prevent the exothermic by an electric power loss and improve the performance of an ultrasonic echo Doppler device by transmitting a chirp wave or code modulated wave for the detection of the echo strength distribution of an ultrasonic receiving signal and transmitting a simple burst wave for the detection of Doppler component of an echo.

CONSTITUTION:A transmitting waveform generator 4 generates a chirp wave and a burst wave switchingly according to B/D switching signal, which waves are supplied to a power amplifier 5. The power amplifier 5 amplifies the both

02-142550

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wide band and narrow band transmitting pulses required for B and D, respectively, by common low power sources +MV and -MV, and the pulses are applied to a probe 6 which transmits them as ultrasonic signals. According to the B/D switching signal supplied by a 1/2 divider 3, a switching circuit 8 connects the output signal of a receiving amplifier 7 with a dispersing compression type B mode receiving part 9 when the chirp wave is transmitted, and with a pulse Doppler receiving part 10 when the burst wave is transmitted. A DSC 12 separates or synthesizes a fault image by the internally stored B mode echo and the data of the Doppler analyzing result to display on an indicator 13.

5. 02-128760, May 17, 1990, PULSE TYPE ULTRASONIC NON-LINEAR PARAMETER CT; YOSHIKATSU NAKAGAWA, A61B 8*08; A61B 8*00

02-128760

L15: 5 of 19

ABSTRACT:

PURPOSE:To visualize a sonic velocity tomogram in addition to a non-linear parameter tomogram and a damping coefficient tomogram by using a burstlike pulse wave containing ultrasonic waves having several wavelengths as a primary wave to measure the propagation time of said pulse wave and simultaneously reconstituting the sonic velocity tomogram of an examinee.

CONSTITUTION:A burstlike pulse ultrasonic wave having single frequency is

transmitted from a transmitter 1 by the burst signal generation circuit 11 driven by a trigger circuit 10. The signal received by a wide-band receiver 2 passes through band-pass filters 25, 29 for measuring amplitude and the circuit of a propagation time measuring part and the respective

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signals are measured as projection data. In the propagation time measuring part 21, the difference between triggered time and the detection time of an edge is known by a counter to measure a propagation time. By adapting the reconstituted algorithm used in a non-linear parameter CT to the projection data from the measurement of the amplitudes of obtained primary and secondary waves, the respective tomograms of a non-linear parameter, a damping coefficient and sonic velocity are simultaneously obtained.m

6. 01-109987, Apr. 26, 1989, MAGNETIC RECORDING AND REPRODUCING DEVICE; JUN HIRAI, H04N 9*84

01-109987

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01-109987

L15: 6 of 19

ABSTRACT:

PURPOSE:To prevent interference between a chrominance carrier signal and a wide band luminance signal by supplying the carrier chrominance signal component mixed in a luminance signal system to a comb-line filter of the carrier chrominance signal system via an attenuator and a subtractor.

CONSTITUTION:An output of a burst mute circuit 31 of a luminance signal Y is fed to a subtractor 32 via a switch 33, a BPF 34 and an attenuator 35. Thus, the subtractor 32 mixes the reproduced carrier chrominance signal C and the carrier chrominance signal mixed in the luminance signal system and supplies the result to a comb-line filter 14 including a one-horizontal period delay line 1H 15. Thus, in adding a luminance signal and a carrier

01-109987

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chrominance signal by an adder 7, the mixed chrominance component is cancelled and the interference between the carrier chrominance signal and the wide band luminance signal is prevented by one comb-line filter.

7. 63-108839, May 13, 1988, DEMODULATOR; TADAAKI ISHIZU, H04L 27*00

63-108839

L15: 7 of 19

ABSTRACT:

PURPOSE:To shorten the pull-in time of a reproducing carrier and to lower a frequency to generate cycle skip, by switching a noise eliminating filter in a reference carrier reproduction circuit.

63-108839

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CONSTITUTION:A QPSK burst signal from an input terminal is distributed to a demodulation circuit 9, the reference carrier reproduction circuit 10, and a bit timing reproduction circuit 11 at a power distributor 8. A switch 23 is connected to a wide band area noise eliminating filter 24 from the forefront of a burst to the detecting time of a unique word, and a signal from the power distributor 8 is supplied to a frequency 4-demultiplier 16 through a 4-multiplier 12, a filter 24, and a limiter circuit 14, then the reference carrier is reproduced. When the unique word is detected at a unique word detection circuit 21, the switch 23 is connected to a narrow band area noise eliminating filter 25 side.

8. 63-19988, Jan. 27, 1988, PICTURE SIGNAL TRANSMISSION SYSTEM; KENICHI TORII, H04N 7*00; H04N 11*14

63-19988

L15: 8 of 19

ABSTRACT:

PURPOSE:To obtain a highly accurate picture on the reproducing side by equalizing an original signal to be attenuated at the time of transmission so that the amplitude is fixed and making it possible to transmit a high frequency component in a wide band.

CONSTITUTION:A reference TV signal is obtained through an A/D converter 2 and a matrix circuit 3 on the basis of an original picture signal obtained from a terminal 1. An output of a Y signal is inputted to an amplitude equalizer constituted of a tap gain variable transversal filter 5. The output of the filter 5 is synthesized with I and Q signals and a color burst

63-19988

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signal by an adder 8, the synthesized signal is outputted as an NTSC signal, the NTSC signal is converted at its frequency by a mixer 21 on the basis of a carrier signal and the converted signal is outputted from a terminal 27 through a power amplifier 26. The transmitted signal is detected in-phase synchronously with a local carrier signal outputted from a local carrier

signal generator 12 by a VSB filter 29. In order to smooth an in-phase synchronizing detecting signal band based upon the detecting means, the Y signal is amplified by the transversal filter 5 proportionally to approximate square of frequency up to a signal band synchronously detected by a carrier and a rectangular component.

9. 62-176393, Aug. 3, 1987, MAGNETIC PICTURE RECORDING SYSTEM; HIROMICHI SHIBATANI, et al., H04N 9*83; G11B 20*06

62-176393

L15: 9 of 19

ABSTRACT:

PURPOSE:To obtain the video signal of high resolution by separating a wide band luminance signal into a low frequency component and a high frequency component, converting the high frequency component into the low frequency component, right angle two phase modulating both low frequency components by a sub-carrier and right angle two phase modulating both chrominance signals by the sub-carrier having a phase shifted by 45.degree..

CONSTITUTION:The luminance signal Y is passed through an LPF 27 to form the low frequency luminance signal YL, the Y signal and the YL signal are applied to a differential amplifier 30 to have the high frequency luminance signal YH, it is guided to a frequency shift circuit 31 to convert into a converted

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high frequency luminance signal YH'. The output of a crystal oscillator 34 is guided to a 45.degree. phase shifting device 35, the obtained sub-carrier SC' and the signals YL, YH' are guided to the right angle two phase modulator 32 to form the modulated luminance signal Y', the chrominance signals CW and CN are guided to the right angle two phase modulator 33 to obtain the modulated chrominance signal C'. The output of a synchronizing signal generator 37 and a burst signal from a burst forming circuit 36 are supplied to mixing circuits 38, 39, added to the modulated signals Y', C' to form signals Ysb, Csb and they are recorded on a tape 46 by recording heads 44, 45 of two channels through FM modulators 40, 41, and amplifiers 42, 43.

10. 62-115987, May 27, 1987, VIDEO DISK RECORDING AND REPRODUCING DEVICE; MASUO OKU, H04N 9*86

62-115987

L15: 10 of 19

ABSTRACT:

PURPOSE:To completely eliminate a cross talk interference between a

luminance signal and a chrominance signal by providing a means for forming the first recoding signal by FM modulating the luminance signal and a means for forming the second recording signal by FN modulating a color difference TDM signal.

CONSTITUTION:Optical heads 21a, 21b for covering an external peripheral area of a disk 20 and an optical head for covering a circumferential area are provided, the luminance signal (h) of a wide band in the external peripheral part having a good circuit recording characteristic and the color difference TDM signal (i) obtained by time sharing and multiplexing two color

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difference signals having a comparatively narrow signal band in an internal peripheral part are FM recorded as component signals respectively in different areas by using the different optical heads. In the disk, a time base fluctuation is detected with a good accuracy and added to a synchronizing pulse or the luminance signal and the color difference TDM signal as time base information so as to be corrected to have its frequency of a relation of 1:2 and further burst signals respectively integer times as large as a horizontal scanning frequency are applied respectively. Thereby, a reproducing picture having a mutual interference between the luminance signal and the color difference signal constituting a color video signal can be obtained.

11. 62-8696, Jan. 16, 1987, MAGNETIC RECORDING AND REPRODUCING DEVICE; SHIGERU OGATA, H04N 9*83

62-8696

L15: 11 of 19

ABSTRACT:

PURPOSE:To obtain a magnetic recording and reproducing device in which a burst signal is little deteriorated even in several dubbings by expanding the passing band of a chrominance component only in the burst period of the chrominance component.

CONSTITUTION:A compound video signal inputted from an input terminal 1, the luminance signal of which is taken out at a luminance signal process circuit 2 and is FM-modulated, and is mixed with a low-pass conversion chrominance component ingredient at a mixer 7 and is recorded on a magnetic tape by a magnetic head 9. The chrominance component ingredient in the video signal is

62-8696

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taken out at a BPF3 or a BPF32 and through a switch 33 and an ACC4, it is

converted to a low-pass frequency by a frequency converter 5, and is band-limited at an LPF6 or an LPF38, and is inputted to the mixer 7 through a switch 39. By a burst gate pulse from a burst gate generating circuit 31, the switches 33 and 39 are controlled so as to select the BPF32 and the LPF38 of wide band in the burst period.

12. 61-161892, Jul. 22, 1986, MAGNETIC RECORDING SYSTEM OF COMPOSITE COLOR TELEVISION SIGNAL; KENGO TAKAMIYA, H04N 9*85

61-161892

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61-161892

L15: 12 of 19

ABSTRACT:

PURPOSE:To improve the defect of a resolution reduction and to execute the wide band recording by band-converting part of a high frequency band of a luminance signal component to the frequency of or close to an odd-fold of 1/2 of a horizontal synchronizing signal of reduction of a luminance signal component, and making it into a recording signal.

CONSTITUTION:An input composite signal EC.sub.1 is supplied to a cascade connecting circuit 3 composed of a comb-filter 2a, an LPF2b and a delay circuit 2. Here, a wide band luminance signal EY.sub.1 is separated and this is divided into a low frequency band component EY.sub.1.sub.a and a high frequency band component YE.sub.1.sub.b. After the high frequency band

61-161892

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component EY.sub.1.sub.b is band-converted, the component is made composite so as to keep an interleaving relation at a composite circuit 10 again. On the other hand, by a BPF14, a modulated chromaticity signal ES2 is separated, this is band-converted through a burst sampling circuit 16, an oscillating device 17 and a frequency converter 22 by the signal and a band converter 15, and made into a modulated chromaticity signal ES3 in which a carrier is suppressed. This signal is sent to a composite circuit 25, made composite with a luminance signal EY4 and made into a recording signal.

13. 60-247391, Dec. 7, 1985, SUBCARRIER REPRODUCING CIRCUIT FOR TELEVISION RECEIVER; KUAN RONARUDO, H04N 9*45

60-247391

L15: 13 of 19

ABSTRACT:

PURPOSE:To prevent the degradation of a picture without shortening a video band width by comparing the output of a variable frequency oscillator with the output of a fixed frequency oscillator and a color burst signal taken out from the video signal of a television receiver by an error detecting circuit and controlling the variable frequency oscillator in accordance with comparison results.

CONSTITUTION:A capacitor 34 of a sample holding circuit is charged to a voltage corresponding to the error signal generated in the preceding vertical blanking period. A switch S3 is disconnected from the capacitor 34 during a vertical active field, and the electric charge of the capacitor 34 is not

60-247391

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changed and remains till the next vertical blanking period because the input impedance of an amplifier 36 is very high. Consequently, an adding circuit adds the output of a phase detector 24 generated between vertical active fields and the output of the phase detector 24 generated in the vertical blanking period. A synthesized error signal in the output of the adding circuit locks the phase of a wide band oscillator 50 with the coming color burst signal. Consequently, wow and flutter of a recorder are corrected even if the phase or the frequency of the color burst signal are shifted considerably from 3.58MHz standard value.

14. 60-136487, Jul. 19, 1985, VIDEO SIGNAL RECORDING AND REPRODUCING DEVICE; YASUTOSHI MATSUO, H04N 5*91

60-136487

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ABSTRACT:

PURPOSE:To regenerate a reproduction sampling point at a position approximately equal to that of a recording mode by recording and reproducing a reference burst signal which controls the phase of a sampling pulse for resampling in a reproduction mode with multiplexing to a video signal.

CONSTITUTION:The video signal of a wide band which is applied to an input terminal 1 is supplied to a sampler 2 as well as to a signal generator 3 and sampled with a frequency f_s . At the same time, the reference burst signal is produced for a specific period within a vertical flyback time. Then a time division multiplex signal is extracted via a switch 13 and then supplied to a recording system of a recording/reproducing device 4. This

60-136487

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multiplex signal is reproduced and both the reproduced sampling signal and the reference burst signal are extracted. The reproduced time division

multiplex signal is supplied to the generator 3, a sampler 5, a 1H-delay circuit 6 and an LPF11 respectively. Thus a signal is obtained via a sampler 7, an adder 8, an HPF9 and a mixer 10 as if it were sampled with a frequency $2f_s$.

15. 60-136486, Jul. 19, 1985, RECORDING AND REPRODUCING DEVICE OF VIDEO SIGNAL; YASUTOSHI MATSUO, H04N 5*91

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L15: 15 of 19

ABSTRACT:

PURPOSE:To regenerate a reproduction sampling point at a position approximately equal to that of a recording mode by recording and reproducing a reference burst signal which controls the phase of a sampling pulse for resampling in a reproduction mode with multiplexing to a video signal.

CONSTITUTION:The video signal of a wide band which is applied to an input terminal 1 is sampled and held with a sampling frequency f_s by a sampler 2 and applied to a switch 13. While a signal generator 3 produces a reference burst signal of a specific section within a vertical flyback time of an input video signal. This reference burst signal is multiplexed to the video signal and extracted through a switch 13. In this case, a time division

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multiplex signal is supplied to a recording system of a recording/reproducing device 4. Then the reproduced time division multiplex signal of the device 4 is supplied to the generator 3, a 1H-delay circuit 6 and an LPF11 respectively. Then a reproduced video signal is delivered as it were sampled with a frequency $2f_s$, through samplers 5, 7, an adder 8, a high-pass filter 9, and a mixer 10.

16. 60-7360, Jan. 16, 1985, ULTRASONIC DIAGNOSIS APPARATUS; KENICHI NAKAMURA, G01N 29*06; A61B 8*14

60-7360

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ABSTRACT:

PURPOSE:To facilitate a wide band driving in the case of non-resonance driving and a high frequency burst driving by opening and closing alternately between a power source and a cable and between two ends of a parallel circuit of a stray capacity of the cable and an oscillator.

CONSTITUTION:When a square wave driving signal A is put out from a driving circuit 12, a source voltage $V_{sub.0}$ is applied between output terminals M, N of a transmission circuit. In other words, a transmission signal B has a voltage $V_{sub.0}$ in a section $K_{sub.1}$. In a section $K_{sub.2}$ in which the output of the driving circuit 12 has a high level voltage $V_{sub.2}$, charge stored in a capacitor 4 which is a stray capacity of a cable 2 and an

60-7360

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oscillator 3 is discharged through a switching circuit in the ON stage so that the voltage level of the transmission signal B becomes zero in the section $K_{sub.2}$. In the section $K_{sub.3}$, the level of the transmission signal B becomes the source voltage $V_{sub.0}$. With this constitution, in the case of non-resonance driving, a square wave transmission signal B can be put out. Therefore, an ultrasonic output is not reduced much even in the high frequency region and the apparatus can be applied to a wide frequency band and a high frequency burst driving can be performed.

17. 59-111075, Jun. 27, 1984, METHOD FOR ULTRASONIC MEASUREMENT OF POSITION OF UNDERWATER TOWING BODY; JIYOUJI OKANO, G01S 15*06; G01S 15*96

59-111075

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ABSTRACT:

PURPOSE:To make it possible to calculate the position of an underwater towing body with good accuracy, by transmitting signals respectively different in frequencies from the transmitters attached to a platform while receiving said signals by one receiver attached to an underwater towing body.

CONSTITUTION:When a pulse signal is transmitted to transmitters 5.sub.1.approx.5.sub.3 from the signal treatment apparatus 2 provided to a platform, these transmitters 5.sub.1.approx. 5.sub.3 transmit burst signals respectively different in frequencies $f_{sub.1.approx.f.sub.3}$. These ultrasonic signals are received by the receiver 6 attached to an underwater towing body 4 and the received signals are transmitted to the apparatus 2

59-111075

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through a cable 3. In this signal treatment apparatus 2, for example, the receiving signal from the receiver 6 is separated into three signals with different frequencies $f_{sub.1.approx. f.sub.3}$ through a wide-band filter 7

by matched filter 8.sub.1.approx.8.sub.3 and the peak values of the center frequencies f.sub.1.approx.f.sub.3 are detected by detectors 9.sub.1.approx.9.sub.3 while the distances between the transmitters 5.sub.1.approx.5.sub.3 and the respective distance differences are measured in a measuring operation circuit 10 to measure the position, that is, the distance and the azimuth of the underwater towing body 4 relative to the platform 1.

18. 59-89088, May 23, 1984, TELEVISION TRANSMITTER OF HIGH IMAGE RESOLUTION; TOYOKATSU KOGA, et al., H04N 9*02; H04N 9*50

59-89088

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ABSTRACT:

PURPOSE:To transmit a TV signal of high image resolution by extracting an image pickup signal of a wide band out of a balanced modulating circuit and giving the color signal processing to the image pickup signal so as to secure the compatibility with the NTSC standard system.

CONSTITUTION:A balanced modulating circuit 24 produces a luminance signal of a wide band and color difference signals, e.g., R-Y and B-Y from image pickup signals of three primary colors R, G and B. The circuit 24 limits the signal Y and two color difference signals to an m-fold band compared with the NTSC standard system. Then the rectangular double phase amplitude modulation is given to those color difference signals with an (m+1)-fold subcarrier

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frequency compared with the chrominance subcarrier frequency of standard system. This output signal is sent to a mixer 28 via a BPF25 and mixed with a subcarrier frequency (m+2) times as much as the frequency of chrominance subcarrier to be converted into a chrominance signal of a difference chrominance subcarrier frequency. This chrominance signal is multiplexed with the signal Y, and at the same time a burst signal, a synchronizing signal and a pilot signal of (m) times as much as a wobbling signal are added 23 together. Thus a TV signal of high image resolution is delivered.

19. 56-96583, Aug. 4, 1981, AUTOMATIC EQUALIZING SYSTEM OF ADAPTIVE TYPE; SATORU TOKIMASA, et al., H04N 7*02

56-96583

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ABSTRACT:

PURPOSE:To make automatic equalizing stably for a wide band, by using

the multiburst in the test signal inserted within vertical blanking period of TV broadcast waves and controlling a variable equalizer through the detection of level by peak rectifying and integration.

CONSTITUTION: Variable equalizers VEQ1.approx.VEQ6 are connected to an input terminal IN, and an equalizing circuit EQL is connected to the output side. The equalizing circuit EQL at the output side makes waveform compensation and ghost erase through the use of synchronizing burst and input is made to BPF of VEQ1.approx.VEQ6 via the gate G and distribution circuit DV. The BPF is taken as a filter which regards the multiburst as pass band, and the output

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of BPF is fed to a phase synchronizing oscillator PLO and rectifying/amplifier RA to control VEQ1.approx.VEQ6 through the detection of level by peak rectification and integration, and automatic equalization with stable and wide band can be made with VEQ1.approx.VEQ6.

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